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EDITORIAL NOTES.

A NEW YEAR.

To all of our readers, Greeting! May the year deal kindly with you, and bring you much that is good and little that is of sorrow or trouble; may the spirit of peace and harmony prevail with you throughout the year, and may the mantle of jealousy drop from you as a rag that is worn out; may charity, justice and brotherly love guide you always in your thoughts of and your relations with your fellow practitioners of medicine; may it bring an end to bickerings and dissensions, and, departing, may the year leave with you a better stored mind, contentment with yourself and your fellows, and the inward knowledge from which comes peace of mind, of a twelve-month of good, honest work, done with the very best that is in you and to the betterment of at least a portion of mankind. Give of your time and your brains the best you have to your medical society, that, in so giving, you may unselfishly help the entire medical profession and the people who are dependent upon it for health and protection; where there is an active and industrious medical society, there will you find good doctors and responsive and grateful patients. Let no word of idle slander or supposititious criticism of a colleague pass your lips; if you can not speak well of a brother physician, speak not at all, for when you slander another physician you hurt yourself as well, and the entire profession is belittled in the eyes of the people. May your interest in your medical society work increase with the passing months, and may the year close upon a more closely united and more intimately related medical profession, thus giving to the people of our State the very best medical supervision. May happiness be with you, one and all.

SIXTH VOLUME.

With this issue the JOURNAL enters upon its sixth volume, and it bespeaks a continuance of that friendly help and co-operation which you have given it in the past years, for the present year, and for those to come. That it has prospered more than, six years ago, we could have thought possible, is largely due to your aid and your assistance. The Publication Committee extends to you its sincere thanks for the hearty manner in which you have supported all of its policies, and the appreciation which, from time to time, you have shown of its work and its efforts to put in your hands each month a little something that may help you. We ask you to continue this support and to extend it. With this issue nearly every advertisement of a medicinal preparation that has not been approved by the Council on Pharmacy and Chemistry has been dropped. One or two, for which the contracts have yet a month or so to run, remain; but they will not appear after the expiration of the contracts, unless approved by the Council. Of course there is no particular credit to be claimed for adopting this standard for our advertising pages—it is merely the final outcome of the five years' fight which your JOURNAL has waged upon the nostrum business. What we desire to call to your attention is the fact that eliminating all this unapproved material, makes our advertising pages of more value to you, and also to the advertisers who remain—and we want you to let them know it by taking an increased interest in the announcements of manufacturers which appear in our pages. Will you help us in this way?

DUDLEY TAIT.

To speak with thinly veiled sarcasm of one who has worked hard and long and conscientiously for the benefit of the people and the betterment of a learned profession, does not reflect any considerable degree of credit upon the critic. It is therefore with no degree of pleasure that one reads an editorial in the last issue of the *Southern California Practitioner,* entitled "Tait de trop," for the editorial, even though it speaks highly of the work that Dudley Tait has done for the elevation of our profession, conveys its sting of sarcasm not so much in the tail as in the head. The work that Tait started some six or seven years ago, and which has created no small amount of antagonism and ill-feeling toward himself, is now recognized as the very one essential thing in the elimination of fraud from medical education—*the thorough and rigid investigation of medical schools and preliminary educational requirements.* We have seen enough in the past few years of revelations, here in California, and as a result of the work of the Council on Medical Education all over the United States, to know that without good medi-

cal laws, rigidly enforced, and dealing with preliminary requirements, we would again have the joyous day of the "diploma mill." That the "diploma mill" is a thing of the past is due to just such men as Tait, working honestly and fearlessly to secure *honesty in medical education.* Therefore, when one sees the Board of Examiners deprived of the services and the help of Dudley Tait, it does not strike one who is looking to the defeat of fraud as a cause for rejoicing, irrespective of the reasons, if any, for such deprivation. At times he has seemed to be gifted with a sixth sense which guided him unerringly to the detection of—shall we say "irregularities"? Some months ago, for instance the JOURNAL printed some cases of this sort taken from the records of the Board of Examiners, and among them was the case of one Painton, a graduate of the College of Physicians and Surgeons of San Francisco, who, it appeared, had made false affidavit of the amount of time spent in the college work. Much denial and many angry words came from representatives of the college, but, in the announcement for the year ending May 14th, 1908, of the College of Physicians and Surgeons of San Francisco, we find under "students matriculated 1906-07, freshman medical," the name of H. R. Painton. If he secured his former degree "in the regular course of instruction and without fraud," why should he go back and matriculate as a freshman? It is safe to say that this case, merely one of very many, would never have been detected had Dudley Tait not been on the Board of Examiners. Should we rejoice to see him go from that work? Is it not rather a distinct loss to the people of the state?

The plague situation remains about as it was, though there are certain symptoms of improvement in general conditions. In

THE PLAGUE SITUATION. San Francisco the average number of new cases and infected rats seems to keep up, but rats are becoming scarcer and there has been a decided decrease in the flea population, naturally to be expected with the coming of the winter rains. A number of desirable ordinances have been drawn up and presented to the Board of Supervisors, and it is expected that these will be passed in due season. The police department shows a disposition to cooperate more energetically with the authorities in charge of the anti-plague work, and it is the general opinion that the Board of Health under the newly adopted charter amendment, now consisting of three doctors and four laymen, will be a more satisfactory body; as to that, however, there are differences of opinion and time alone will show how the new plan works. Elsewhere, we reprint the major portion of an article which was printed in the JOURNAL in 1904, by Dr. Lloyd, on the connection of the rat with plague. At the time this was printed, it was almost, if not quite, the first article showing conclusively what we have since accepted—that plague is a disease of rats and other rodents, and to which

disease man is, at times, susceptible. The general request for this article has been so great that we have taken the liberty of reprinting the essential parts of it for your reperusal.

The scientific programme for the April meeting of the State Medical Society is assuming definite shape. It has been the purpose of the committee to

SCIENTIFIC PROGRAM. make all the papers presented of general interest, and to this end the sectional meetings have been largely eliminated and two subjects for symposia are announced, which are believed to be of equal interest to all workers in medicine. Contributors to the programme have generously and wisely consented to limit the reading of their papers to ten minutes. The published papers may, of course, be as long as necessary. In order to prevent long and often tiresome discussions, it is hoped that a rule will be established, limiting discussions to two and a half minutes. Deserving contributors will suffer through neither of these restrictions, for the Society may on demand grant any speaker an unlimited time on the floor. Each of the three mornings and two of the available afternoons are to be devoted to scientific programmes. In response to popular demand, one afternoon is to be left open to allow the visitors to the meeting to see more of each other in a social way than has heretofore been possible. The morning of the first day is to be filled by the address of the President, Dr. George H. Evans, the reports of various committees, and a general discussion of such subject or subjects as seem, in April, of greatest interest to the Society. The second and third mornings are to be devoted to a symposium on syphilis and one on the thyroid gland. The list of promised contributors to these symposia contains the names of Drs. Terry, Moffitt, Wherry, Tait, Hunkin and Thomas. It is hoped that Dr. James B. Herrick of Chicago will also be able to take part in these symposia. The first afternoon of the session is to be given up to a joint meeting with the Western Section of the American Laryngological, Rhinological and Otological Society. Dr. W. Humes Roberts has the arrangement of the programme for this afternoon in charge. One or two other sectional meetings may also take place on this afternoon. The last afternoon of the session is to be devoted to the reading of general papers on both medical and surgical subjects. The names of Drs. Rooney, Hamlin, Wakefield and Robertson are found in the list for the programme of this last day. In addition to the names announced at this date, the committee has in its possession a list of men both from California and eastern states who have promised papers and believe themselves able to be present at the April meeting. The committee hopes in the near future to be able to announce their names and the exact titles of the papers which they are going to present.

"H-M-C" TABLETS.

It is to be regretted that we have not space to reprint in its entirety an article which appeared in the *Journal A. M. A.,* December 21, 1907, exposing the "hyoscin-morphin-cactin" anesthesia. No other preparation has been so extensively advertised, and, because of the position of the gentleman who is putting it out commercially, the fact that he owns a medical journal himself, and is a most prolific writer and contributor to other journals, no other preparation has had so many "write-ups" in a given period as has this wonderful "new" anesthetic. But the *Journal A. M. A.* shows that it is not "new," it is not wonderful, it is a secret proprietary, it is being exploited in ways which, to say the least, are not above question—and it is *dangerous;* just as dangerous, no more and no less, than the old scopolamin-morphin anesthesia which has been known, used and almost discarded, years ago. Do not be misled by the glib words of the promoters, the Abbott Alkaloidal Company, or that most prolific of writers, Dr. Wm. C. Abbott; the stuff is *DANGEROUS.* How many men do you know who have ever given over five thousand anesthesias? Probably not one; possibly one. One such was consulted upon this point, and he gave it as his opinion that the promiscuous use of hyoscin or scopolamin and morphin with or without "cactin" (which is an unknown "concentration") is *dangerous in the extreme.* He has used scopolamin and morphin in properly selected cases, for ten years or more, and he knows whereof he speaks. Even the manufacturers admit that the use of scopolamin and morphin is dangerous, but they claim that they use hyoscin and that hyoscin and scopolamin are not the same clinically. This statement, made by the interested manufacturer, is directly opposed to the statements of all the experts in the world, and is contradicted by the manufacturers of the chemical themselves. As the *Journal A. M. A.* so aptly points out, the manufacturers of this dangerous combination, who are in every possible way urging the members of our profession to use it indiscriminately, and who are making for it the most utterly extravagant statements, must either be ignorant of generally recognized and well known facts, or they must be ignoring them for their own gain. Will you believe the pharmacopeias of the world, the statements of all chemists who have investigated the subject, and the statements of those who manufacture scopolamin, that hyoscin and scopolamin are identical, or will you believe the statement of the interested manufacturer of the "H-M-C" anesthetic that they are not the same? Every physician who has the slightest regard for his obligations toward his patients and his own responsibilities, should read the article in the *Journal A. M. A.* and should remember that hyoscin, or scopolamin, and morphin is a *DANGEROUS* mixture to use, and that "cactin," is inert, despite the contrary statements of the interested manufacturers.

HOMEOPATHIC MATERIA MEDICA.

The materia medica of our homeopathic brethren must have greatly increased since the time of Hahnemann, if one may judge at all from the various remedies which are presented to their attention through the medium of the advertising pages of the homeopathic (?) medical (?) journals that have reached our office. *The Medical Advance, The Hahnemannian Monthly, The Cleveland Medical and Surgical Reporter, The Critique* and the *New England Medical Gazette* are publications of the class indicated, and a casual inspection of their advertising pages is instructive. All of these publications claim to be strictly homeopathic; some of them are strenuously so. Therefore, let us see what they recommend their readers to use: Ferro-nutrine; bovinine; hydroleine; sal hepatica; aletris cordial; celerina; pinus canadensis; anti-itis; Hagee's cod liver oil; Fellow's hypophosphites; sanmetto; Gray's glycerine tonic; bromidia; antikamnia (which appear opposite the advertisement of the American Institute of Homeopathy); pepto-mangan; meatox; glycozone; antiphlogistine; glycothymoline; Peacock's bromides; seng; cactina pellets; chionia; Angier's petrolium emulsion; Colden's liquid beef tonic; dioviburnia; neurosine; germaletum; hydrozone; urasol; glyco-heroin and passiflora. These are merely the "curious" things that are advertised; in addition there are "ads" of a number of standard preparations, some of which have been approved by the Council of Pharmacy and Chemistry. Is it any wonder that the Homeopathic (?) medical (?) journals are as strongly opposed to the work of the American Medical Association, through its Council on Pharmacy and Chemistry, as are the medical (?) journals of the regular school? It is just a matter of dollars and cents, when all is said and done; and the nostrum man has the dollars to pay for advertising space, for that is what makes his business.

FISH OR CHILDREN?

Your JOURNAL has preached on many occasions the necessity of educating our legislators in the matter of the proper sanitary care of the human animals in our state, and once again we revert to the subject. Recently, a gentleman in the South called attention to the fact that our state expended something like thirty times as much money on the care and protection of its fishes as it did for the care and protection of its children! How truly touching! And most of us believe that children have souls and fish have not; yet the fish are protected in innumerable ways—and the children not at all. Possibly we have taken too literally the injunction "Suffer little children to come unto me," and our lack of care for them and their health or their lives is merely an evidence of obedience and a desire to let the little children go to the Lord as fast as possible! Game wardens are active in pursuit of him who catches the delectable trout out of season; but are ordinary town trustees or health officers as active in the pursuit of the par-

ent who sends its child to school unvaccinated, or permits the spread of diphtheria to many other children throug failure to abide by reasonable quarantine orders? And even the few little pennies which the state expends for the sanitary protection of its citizens are doled out grudgingly. Think of it! Fish worth thirty times as much as children!

AN OLD FRIEND.

Vin Mariani was advertised in this JOURNAL some two years ago. When the advertisement was submitted we were at a loss what to do. The Publication Committee had heard that the wine contained cocaine and so wrote to the manufacturers, and asked them for a formula. A most beautiful analysis, supposedly made by a French chemist, was returned and the idea that the preparation contained cocaine was spurned with indignation. Perish the thought! But times change and sometimes wisdom comes out of darkness. The pure food and drugs law was passed —largely through the publicity given to existing rotten conditions by *Collier's Weekly*—and then we began to learn some things. The label had to tell the truth, and, lo! the label on Vin Mariani stated that the preparation contained, if memory serves, one-tenth of one grain of cocaine to the ounce! From *Collier's* of November 16th, we learn that Massachusetts, having a good anti-cocaine law, has been active in the prosecution of its provisions, has advertised certain preparations which contain cocaine and which therefore cannot be sold at retail, and has secured convictions for the violation of this statute. We read, with considerable interest in view of the former protestations of the Mariani people: "Since June seven convictions have been secured for the sale of the following preparations: Maltine with coca wine, Vin Mariani, Standard Catarrh cure." Now do you not think that is rather "going some" for a preparation which the manufacturers stated repeatedly did not contain cocaine? It must be extremely painful to the house of Mariani, benefactors to the human race in general, to have retail merchants convicted for selling their stuff in open violation of an anti-cocaine law; we feel for them in this rude shocking of their delicate sensibilities; but the subject is far too painful to dwell upon.

THE RAT AND HIS PARASITES; HIS ROLE IN THE SPREAD OF DISEASE, WITH SPECIAL REFERENCE TO BUBONIC PLAGUE.*

By B. J. LLOYD, M. D., Assistant Surgeon U. S. Public Health and Marine Hospital Service.

Although there are several hundred species of rodents included in the generic term "mus," we need not, as a rule, concern ourselves with distinctions. The "Norway," or common brown rat (Mus Decumanus), is so well nigh universal and, unfortunately, so intimately associated with sanitary and

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* Read before the San Francisco Microscopical Society.

(This article appeared in full in The Journal April, May and June, 1904, and is such an excellent review of the subject that we here reprint a full abstract of it.—Ed.)

shipping interests, and its habits are so nearly representative of the tribe, that we can practically pay our respects to the entire group in a discussion of this species. * * * A great deal has been said pro and con on the subject of whether or not the common rat flea will attack man. It has at last been fairly definitely settled that the rat harbors several species, and that some of them, at least, do attack man. It is quite probable that even those that do not bite man, if such there be, are not infrequently found on the body, and their mere presence is almost as much a menace as if they did, when the question of plague is considered. * * * The main object of this paper is to bring prominently before you the importance of the rat as a factor in the spread of bubonic plague in insanitary habitations. In discussing this topic, I shall reverse the usual order and ask you to hear a conclusion before I have presented the argument. I regard it as a conservative statement when I tell you that, given a filthy and insanitary environment, the rat probably many times exceeds all other factors combined in the propagation of this disease. * * *

To begin, then, it is a question whether we should regard pest as a disease of man or as a disease of rats which is readily communicable to man. It is just possible that the latter is the proper classification and that plague is primarily a disease of rats. Contrary to the general opinion, plague is a disease which progresses slowly, and only exceptionally and under circumstances with which we are none too familiar does it assume epidemic proportions. Having once gained a foothold, it plays hide-and-seek often for years, lulling its prospective victims into a false sense of security by the insidious nature of its encroachments. It is the general opinion of medical writers, however, that the city or province which harbors this infection will sooner or later be reminded in a very decided manner that the disease is not one that may be treated lightly. Whether we are able, with our present knowledge of the disease and with our improved ideas of sanitation, to prevent in the future what has inevitably resulted in the history of this disease in the past, remains to be seen. I believe that if what we know is put into practical execution, this can be done. As an example of the slow and deadly march of this disease, I have to read to you this extract from the mortuary statistics of the city of London:

In the year 1616 in London there were 9 deaths from plague; in 1617, 6 deaths; in 1618, 18 deaths; in 1619, 9 deaths; in 1620, 21 deaths; in 1621, 11 deaths; in 1622, 16 deaths; in 1623, 17 deaths; in 1624, 11 deaths; in 1625, 35,417 deaths; in 1626, 134 deaths; in 1627, 4 deaths; in 1628, 3 deaths; in 1629, 9 deaths; in 1630, 1,317 deaths.

To sum up, in a total of fifty years of plague in London, from 1601 to 1650, in twenty-five of these years the deaths numbered from 1 to 67 per annum, in eleven other years the deaths numbered from 134 to 996, while in the years 1603, 1625 and 1636 the deaths numbered respectively 36,269, 35,417 and 10,400, these being the largest numbers occurring in one year. If further evidence is wanting, I have to refer you to the number of cities that are known to be infected to-day, and remind you that nine-tenths of them are having only a few cases a month, and some of them only a few cases a year. Recognizing, then, the tortoise-like pace set by this disease, and not forgetting that it may shake off this lethargy and advance by leaps and bounds, let us consider man himself as a source of contagion. It is a common error of belief almost universal among non-medical men and even among many otherwise well-informed physicians, that plague is highly contagious. Except in the pneumonic form, which constitutes less than 5 per cent of all cases, and which differs in nowise from the bubonic type, save in the part of the body at-

cacked, plague can hardly be regarded as contagious. This does not apply to the handling of the internal organs with the bare hands, as some have found to their sorrow in post-mortem examinations, but refers to contact with the exterior of the body of persons suffering from, or dead of, plague. It is a well-known saying that there is no safer place in a stricken city than a sanitary plague hospital, and this saying is literally true. The following opinions on the subject are culled from Thompson's "Treatise on Plague," and are compiled by him from the writings of men whose experience and ability are too well known to be questioned, whatever may be thought of their conclusions.

Dr. Robertson, a British medical officer in Syria in 1841, writes: In reference to the contagiousness (transmissibility) or non-contagiousness of this disease, I beg to state that the result of all my experience leads me to believe that the disease originates in local causes, and that it is not highly contagious. My firm conviction is that the plague cannot be communicated from one person to another in a pure atmosphere, even by contact, but I am not prepared to assert that, if plague patients are crowded together in confined and ill-ventilated apartments, infection will not be produced, just as in typhus.

Mr. Brant remarks: As far as my experience goes, I have been led to doubt the contagious nature of the disease, or, if contagious, it must be in a very slight degree. I have had within the sphere of my observation many cases of the most complete and extensive contact, without the disease being communicated.

Sandison, of Brussa, says: The cases are numerous in which persons escaped the disease after contact with persons seized with it, even in its most malignant form.

Clot-Bey, with his corps of French physicians, "remained in hourly contact with the infected for weeks together and with but one of them taking the distemper." The Royal Academy of Medicine of France, in 1844, after a thorough and exhaustive search in Egypt, reported: "There is not a single fact which indisputably proves the transmissibility of the plague by mere contact with the sick." The experiences of more recent writers on this subject coincide with those of the writers quoted and corroborate their views. Before leaving the subject of man as a source of contagion, it must not be forgotten that under conditions of overcrowding and poor ventilation, human cases may be of considerable importance in producing the disease in others directly. Living in houses where there is plenty of sunlight and fresh air, with proper disposal of sewage, these same human beings can come in daily contact with plague cases with comparative immunity.

Contact with infected human beings being insufficient to account for the spread of the disease, we have to inquire in what way, then, does man become infected? This much we know; living plague bacilli must be brought in contact with the human body externally or internally, and while such contact does not always produce infection, it is sufficient in many instances. Direct inoculation subcutaneously, even with the slightest abrasion, such as is not infrequently produced by the nails, would, I have no doubt, result in infection in a very large per cent. of cases, even in those who live under the most favorable hygienic conditions. The mere contact of infective material, preferably plague tissue, rubbed on the unbroken skin of the guinea pig, is sufficient to infect in perhaps 90 per cent. of trials, and, judging from the number of cases in man which certainly are infected through the skin and which present no cutaneous lesion, I have no doubt that man may be infected in the same way. Without going into details (and you may draw your own conclusions from observation and from the litera-

ture of the subject) I wish to state dogmatically that while infection does take place through the respiratory and gastro-intestinal tracts, and perhaps through the genito-urinary tract, **by far the greater number of persons are infected through the skin, either with or without a discoverable cutaneous lesion.** If this be true, then what may be the source of the bacillus and how does it reach the human body? In the pneumonic form, and in those cases where we have a **lymphangitis pestis** in the pulmonary lymphatics, the sputum is, of course, dangerous. Inasmuch as these cases are not very frequent, we are led to a discussion of "sources other than rats and human cases," rats being reserved for a separate consideration. I use the word source to mean any animal that may harbor the germ, or any material outside of the animal body that may contain living plague bacilli. The evidence here is very conflicting. Competent observers say that cats have the disease but do not die of it. * * *

Various other domestic animals have been reported as suffering from or at least harboring the germs, but the evidence is not so conclusive. * * *

It may be possible that at the height of an epidemic of plague an increased virulence of the bacillus pestis, whatever an increase in virulence may mean, does enable it to become pathogenic for most of the domestic animals. At other times, the virulence of the bacillus may be so lowered that it will not produce the disease with such readiness, if at all, as it is well known that experimentally, at least, the virulence may be so lowered that it will not even kill mice, the most susceptible of all animals. If it is true that domestic animals under certain conditions harbor the germs and transmit them to man without the animal itself becoming ill, we can readily see that this is a matter of the utmost importance, as there is nothing so deadly as an enemy in ambush. * * *

What has been said of fleas and mosquitoes will apply to flies and other vermin. Fomites have long been regarded as a source of transmission, and with apparent good reason. The theory that the plague bacillus has a saprophytic existence in the soil may be mentioned as a possibility.

We now come to the consideration of the rat in particular as a means of disseminating the germs of plague. The question often asked by sanitarians is, not whether the rat is concerned in the spread of the disease, but is he the only agency? It has already been shown that the disease may be transmitted in other ways. We have now to make out a case against the rat, and there should be no difficulty in convicting him as principal, the others being accessories. It is admitted that we are unable to state satisfactorily the way in which the germ passes from rat to man. If I should shoot a man in the street in the presence of credible witnesses, I do not think a jury would acquit me because they did not see the bullet enter his body. Competent evidence can be introduced to establish the following facts regarding rats and plague: Rat plague and human plague are identical. The spread of plague follows along the lines of migration of the rat, and not necessarily along the lines of travel of human beings, unless rats accompany them, as on board ship. Plague produces a greater mortality among rats than among human beings. Plague almost invariably attacks the rats of a city before it appears in human beings. The first cases of plague in a city nearly always occur in a vicinity where infected rats have been found.

The occurrence of epidemics of plague in man without rats infection is so rare as to throw doubt upon the accuracy of such report. In one such instance (Russia) this state of affairs is offered as an explanation of the ease with which the epidemic was controlled. For hundreds of years in districts where plague prevails, the death of rats in large

numbers has been recognized by all classes as a certain omen of impending calamity, and the advent of plague among rats was sufficient to strike terror into the inhabitants and cause them to flee from their homes. The rats themselves, after a time, become panic-stricken and, losing their usual fear of man, scatter in headlong flight from the infected locality. Rats dead of plague are often found in rooms occupied by human victims. There are numerous instances in which infection in the human being has followed the handling of rats dead of the disease. Direct inoculation has been reported in one case as follows: "A dog belonging to a patient brought into his (Mr. Hill's) bedroom a rat he had killed, and plumped it down on the bed. Mr. Hill at once threw the rat away. The dog then licked his master's hand, on which there was a slight abrasion, and plague showed itself a few days later." I shall not attempt to present in detail evidence in support of the foregoing statements. They can easily be verified by reference to the literature of the subject. A few such references will be introduced, and you may follow up the subject at your pleasure. The earliest historical note connecting rats with plague is in 1st Samuel, fifth and sixth chapters, 1400 years B. C. From Renney (1851), in his account of plague in certain cities in Arabia, we have the following: "There was no particular disorder among cattle, but the outbreak of plague was preceded and accompanied by a great mortality among the rats in their houses." From Creighton, who is quoting Planck: "In the houses of families suffering from an outbreak of plague, rats are sometimes found dead on the floor. * * * Planck has seen them himself. * * * He mentions nine villages, all of them endemic seats of plague, in which the premonitory death of rats in the infected houses was testified." The same author, quoting Baber in China (1878): "The rats are first affected; as soon as they sicken, they leave their holes in troops, and after staggering and falling over each other, drop down dead. * * * The approach of bubonic plague may often be known from the extraordinary behavior of rats who leave their holes and issue onto the floors, lose their accustomed timidity and fall dead." The same author, quoting Lowry (1882): "In nearly every house in the Chinese village of Pakhoi, where the disease broke out, the rats had been coming out of their holes and dying on the floors." In addition, White, Gilder, McAdam, Forbes, Glen, Ranken, Arnaud and others make similar statements of various epidemics.

The German Plague Commission (1899) makes the following statement: Rats generally suffer from a form of plague which occurs in man rarely, if at all, namely, plague of the intestines. When thus diseased they evacuate great quantities of plague germs. It is probable that numbers of plague cases among human beings are due to contact with the evacuations of diseased rats, e. g., in the case of the flooring thus contaminated being trodden on by the naked foot. * * * Children often infect themselves by crawling on the floor and then putting their fingers in the mouth, thus getting plague with neck buboes. * * * It has therefore been proposed to wage war against rats with traps, poisons, suffocating gases, artificially induced epidemic diseases. * * *

Cantlie makes the following observation on prophylaxis: "Seeing that rats and mice are the animals which convey plague, * * * their destruction before a threatened invasion of plague is an absolute necessity if the disease is to be averted."

Manson likens a plague-threatened city to a grate in which a fire is about to be started; the coal is the human inhabitants, the sticks of kindling are the rats and the lighted match is the plague germ.

Simond observes that epidemics of plague among rats follow a course analogous to that of the epidemic in man. The following omen is from Montenegro:

It may be said that the plague is a disease of rats which readily infects man. Generally, before the epidemic breaks out in a city, bodies of rats which have died of plague are found in the streets and houses. Hankin has proved that generally the first cases in a population occur precisely in those quarters in which the existence of dead bodies of rats has first been discovered, and in many cases it has been possible to demonstrate that the propagation of the epidemic from one town to another does not follow the route taken by the fugitives from the infected human population, but that taken by the rats in their flight.

Snow of Bombay established that the propagation of the plague did not follow the panic produced in the population by the human cases, but took place long after when the rats emigrated, and in the direction followed by them.

Thomson writes: Rats are more liable to pest than mankind. * * * It may be stated that plague is a disease of rats, and communicable from them to man. Generally, before an epidemic breaks out, dead rats are found in the streets and houses. At Satara, and in the infected district thereof, as at Karad in 1897, and subsequent epidemics, this was observed and commented on by the people. The first cases of plague develop precisely in those places where dead rats are first discovered, and spreads from those as foci, rather than following the routes taken by the fugitive panic-stricken inhabitants. Handling the dead bodies of rats, in the open air, is not dangerous; going into the warehouses or grain stores to remove them is highly dangerous and fraught with great risk, owing to the insanitary conditions of such pest centers. The fact that rats found under such conditions were pest-infected was proved repeatedly by post-mortem and bacteriological and sub-culture tests, etc.

Here we rest our case against the rat. Convicted he stands, and if you indulge me a moment longer, I would like to ask, what shall we do about it? I would like to suggest that there is one place where he should be absolutely exterminated, and that is on board ship. This is a simple matter when the vessel is empty, but the problem is not so easy of solution when the vessel is loaded. The trouble arises from the fact that if a plague-infected rat is suffocated in the bottom of the hold of a vessel, that rat cannot be removed until the cargo is discharged. Rat-guards on the lines, while it is a very important measure, do not shut out all shore rats. It is argued that it is useless to kill the rats on a vessel leaving an infected port, if you do not remove them from the vessel, an almost impossible task. I do not accept the statement that such a procedure is useless when the rats are not removed. I think the mathematical chances of infecting a port of destination are infinitely less when you have three rats in the hold of a ship dead of plague and 300 dead of suffocation, than one where you have three rats dead of plague and 300 rats that are living. In other words, I think it is a great deal better than doing nothing at all. So far as a crusade against the rats in a municipality is concerned, I think it is a very important auxiliary measure. The importance of the killing of rats in an infected city is lessened only by the many difficulties which attend such a procedure and the rapidity with which they are replaced. The pertinent question has been asked, "If plague will not exterminate rats and mice, what will?" It is probable that if all our habitations were well lighted (sunlight) and well ventilated and were otherwise in good sanitary conditions, plague would die a natural death. It is possible that if plague is allowed to fester in a filthy, overcrowded and otherwise insanitary part of a city, that after years of increase in virulence it may lose its re-

spect for even sanitary habitations, and their occu-
pants will no longer be immune.

I shall close this paper with one other observa-
tion: Rat infection in San Francisco, while it has
never been extensive, has borne a striking analogy
to the infection in human beings, and plague cases
occur in places where infected rats have been found;
in one instance dead plague rats and a dead human
victim being found in the same room.

It has been found in the application of sanitary
measures in various places that poisoning rats, disin-
fecting, medical inspection, etc., while they are very
important auxiliaries, are not nearly so effective as
the tearing out of filthy habitations and the re-
construction of such buildings on good sanitary
principles.   This kind of work goes far toward
getting rid of the rat by alteration of environment,
and at the same time decreases the chances of in-
fection from such as remain, inasmuch as the rats
will seek the darker recesses of the building, and
in this way will not come in contact with its human
occupants nearly so frequently as they do in the
close, dark rooms of many of our present buildings
in Chinatown.   Not only this, but it has been re-
peatedly noted that the danger of contracting plague
from infected rats is very much lessened when the
contact with the rat is in a pure atmosphere, just
as it is with human cases.

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THE CONTINUANCE OF PLAGUE IN SAN FRANCISCO.*

By W. C. HASSLER, M. D., San Francisco.

On February 29th, 1904, the last verified case
of bubonic plague was noted by the Department of
Health.   During all of the period prior to the re-
porting of the first case in 1900 and up to April 18,
1906, active measures were continued looking to the
sanitation of the city, particularly that area then
accepted as the infected section of the city, to wit:
Chinatown and North Beach; and while these ac-
tive measures, which included catching and poison-
ing of rats, from 25 to 50 of which were examined
daily in the bacteriological laboratory for infection,
and the spreading of chloride of lime and carbolic
solution over those areas considered suspicious and

dangerous, by reason of infection having existed
thereon, it is but natural to assume that the fire of
April 18th and days following thoroughly eradi-
cated any foci that remained hidden in these sec-
tions or adjacent areas and that the city might have
reason to believe it had eliminated bubonic plague
from its midst.

A review of the situation will, however, im-
mediately present proofs that this city can never
assume that it will remain free of infection so long
as the disease exists in foreign ports, which have
communication by steamship and other transporta-
tion facilities with the city and said places.

The question of interest, however, at the present
time, centers upon the continuance of plague in San
Francisco, excepting only that interval that oc-
curred between 1904 and May 27, 1907, and the
fact to be established is: was the infection dormant
during the period of this time or was the city
really clean and free of the disease; and was it re-
infected from outside sources, which may have been
from one or two points?

To consider the first proposition, we know that
the bacillis pestis, in favorable soil, will remain ac-
tive for many months; it having been stated by
some writers and investigators to be many years.
Had not that portion of the city where the infection
originated been totally destroyed, the present epi-
demic might be attributed to reinfection from inter-
nal foci; but the fact that no case had occurred for
so long a period of time and that the infection was
not found in the hundreds of rats examined during
the period, it would seem that the source of the re-
currence must be looked for among the outside fac-
tors, which are two-fold.

Infection might occur at any time from rats
brought to this port by foreign ships, infecting those
rats that find their habitat along the water front.
Secondly, the infection may have come from the
bay counties adjacent to San Francisco which had
not observed the sanitary precautions that San Fran-
cisco had and which were never entirely free from
the disease or its menace to further spread; as was in-
stanced in the case of the boy infected with bubonic
plague, unquestionably contracted by having been
bitten by a wounded squirrel, shot by him while
hunting in the Contra Costa hills.

Infected rats would find it easy to travel back to
San Francisco from those points along the eastern
shores of the bay by means of the vessels receiving
and discharging cargo between the respective points.
Or, it would be possible to infect the river
boats and tugs plying between San Francisco and
other bay points, which in due time would become
foci for the distribution of the shore rats to San
Francisco.

This is but one aspect of the infection from the
bay counties.   It is quite possible that San Francisco
was reinfected from points further distant, as the
history of the first case noted in 1907 would indi-
cate, to wit: Oscar Tomie, a sailor on the steam
tug "Wizard," which plied between San Francisco,

Mendocino County and as far south as San Luis Obispo.

Oscar Tomie had been regularly employed on this vessel for some six weeks prior to his illness and had not left the vessel until May 27th, when he was taken to the Marine Hospital, after having passed one night on shore, prior to his going to the hospital, where he died two days later of bubonic plague.

The vessel during this period was on a trip north and foundered before arriving at her destination; hence it is impossible to say, definitely, whether infected rats existed upon her.

The crew of the ill-fated vessel arrived in San Francisco some weeks later, all in a healthy and normal state, but had nothing of their effects except the clothes they had on at the time the vessel sank.

The "Wizard" had been tied alongside of a vessel that had arrived from Hilo, Japan, a few weeks prior to the sickness of the sailor Tomie, and as plague existed in Honolulu at the time, it is as probable that this vessel was infected by rats from the Hilo ship, as it is that the vessel was infected by local bay rats.

All of the foregoing are problems to be considered in the analysis of the present situation, it being an established and recognized fact that bubonic plague is spread principally to uninfected areas by means of the rat.

The present epidemic had its original focus adjacent to the water front, and that isolated foci are scattered over the city irrespective of location, class of residence, soil and character of individual is not a peculiarity of the epidemic, but a necessary result of virulent infection brought to a particular locality, and the sooner this fact is established and recognized the better it will be for the general welfare of the inhabitants of this city.

I say this because of the indifference manifested by the hundreds of individuals; even in the ranks of our own profession we still find doubters that plague exists and optimists that claim plague will never attack the white race of this city by reason of our trade winds, particularly favorable location, etc.

The original nidus is, or has enlarged to the extent that its scope now extends over the entire bay frontage and a goodly portion of the central part of the city, with a fair promise of spreading to the extreme limits of the county.

At the original foci we find upon close survey the following conditions: First, a class of people while in the main clean and given to much scrubbing and washing, on the other hand ignore all laws of hygiene regarding ventilation and cubic air space in their sleeping apartments. This class is in part the same that existed in this locality prior to the fire, but differ from the type who lived here in former days, and is distinctively higher class than usually characterizes water front inhabitants, or what might be construed by the use of the term "Water Front." They are generally careless in the disposal of their waste and refuse; being rather inclined to accumulate and hoard all manner of garbage pickings, which in part is utilized to feed the goat, chickens and other fowl kept by them, and in part disposed of as junk.

In addition to this we have a sandy surface soil that will vary in depth from 6 inches to many feet before an impervious layer of clay is reached and which in the main is dry and forms an ideal incubator for the hatching and propagation of fleas and other vermin, which are the intermediate host between the rat and the human.

Owing to the complete destruction wrought in the city in 1906, there resulted, generally speaking, two things: first, an almost complete reversal in the manner of living among those deprived of homes. Shacks, tents and nondescript houses sprang up singly and in groups like mushrooms on a dunghill. The latrine replaced the former toilet that had sewer connections, and in hundreds of instances the latrine was even lacking, night soil and discharges being thrown on the surface ground because the requisite manual labor necessary to construct a latrine was considered a waste of time and energy; garbage and kitchen waste was disposed of by burial, or more likely by dumping on to some neighbor's property, or if not, into the public street or corner cesspool.

With this, the individual sanitation fell so far below par that it was or should be placed at zero in the scale. This was due to the difficulty or inconvenience in obtaining water; for, I believe, that no matter how low the individual is rated, if running water is at hand he will use it, but will in no wise allow his equanimity to be disturbed by dirt if its removal costs more than a few yards' walk, and what holds true of individuals, is likewise applicable to groups.

Next to be considered is the primary host, "the rat." It has been remarked by many that the great fire destroyed thousands of rats. This is no doubt true, but those whose duty it was to work on the fire line will bear witness to the fact that as the fire spread it was preceded by an army of rats, which with almost human perception recognized the danger and fled to the zone beyond.

Unquestionably, many perished in the walls of buildings or in the merchandise contained therein, but the ratio of death is low compared to the numbers then existing.

The sequence of this was an overcrowding of the new sections of the city that already had their quota of rats, for it may be taken as a fact that every part of any city will always have just as many rats as that section can supply food for, minus the number destroyed by poison, trap or other means by the the residents thereof.

In this migration, was there a transmission of infection from the lower section of the city? This is a debatable question that might be argued pro and con and which will be left open for discussion, bearing in mind the fact that it was 25 months after the fire that we registered our first death from plague.

In connection with this, I present a factor, to wit: plague is often passed unrecognized by the general

practitioner. This is particularly true of the pneumonic types and a review of the vital statistics for the year May 29th, 1906, to May 29th, 1907, shows that there were in all 748 deaths from pneumonia, only 463 of which were reported prior to death by physicians. The death certificates show that these cases ran an extremely short course and that the majority occurred among the lower classes. This may or may not be looked upon with suspicion in view of later developments.

These two points, to wit: the possibility of the old infection being transmitted into the new section of the city and that many of the cases passed unrecognized prior to May 27th, will be left to debate for final settlement and another aspect of the situation be given for your consideration; namely, the rat driven from its original haunt into the new section of the city was, by force of natural instinct and circumstances, desirous of a return to its original haunts on the abatement of the causes that had driven him out, to wit: the earthquake and fire.

Here, by reason of the lack of vigilance on the part of the authorities in permitting foreign vessels to dock without the safeguards, namely, ratguards and fenders, or perhaps by contact with infection from rats of local bay points, they became infected with the bacillis pestis.

Food being scarce and the conditions generally greatly disturbed, it was but natural for the rat to return, if only as a visitor, to the section where he had been temporarily housed, and found convenient pickings and safe harboring place beneath the wooden floors of the hundreds of small and unsanitary stables that exist in the area contiguous to the burnt district, leaving perhaps his dead body or transmitting the infection to the rodents of the locality, which in turn are carrying this infection from one point to another over the entire city.

Coincident with the present outbreak, the city has been suffering from an epidemic of fleas. While this pest is always with us, it has been exceptionally numerous during the last summer, and as it is principally through this medium that plague is transmitted to the human, it therefore is second only in importance to the rat which is the primary host.

From experimental sources we believe that the bacillis pestis remains active in the flea for about 7 days. Whether it is transmitted from one flea to the other has not been entirely proven, but positive proof exists of the transmission from rat to flea and from flea to human.

This epidemic of fleas may be accounted for in various ways. First, there was an unusual amount of dust and dirt distributed over the city in the process of cleaning away the debris and ruins. Second, streets and sidewalks were for months unswept. Third, there was an overcrowding of the new business and residence section, which as a result did not have the conveniences or the time requisite for the usual thorough cleansing. Fourth, the public conveyances and street cars were likewise overcrowded and dirty, which, with the changed conditions of living, created a condition favorable to the hatching and propagation of fleas.

What influence all such conditions have on the spread of the infection, though problematical, should not be lost sight of in the analysis of this situation nor in the ultimate sanitation thereof. The consideration of this latter, when all is said and done, remains as the most important in the eyes of the layman.

The plan at present energetically carried on is unquestionably the right one and if our citizens can be duly impressed with the seriousness of the menace and the necessity for their response and help in the sanitation of individual premises and the fight against the rat and the flea, it can be but a question of months when this peninsult will be entitled to a clean bill of health.

In this work none can aid as much as the family physician or medical adviser, if he will but consider it a part of his professional duty to his patients.

The slogan of this campaign is "THE RAT MUST GO!" This is accomplished first by destroying his home; second, by cutting off his food supply, and third, by poisoning and catching him if he still finds a lodging place or persists in remaining in the neighborhood.

The Board of Health is actively engaged in the destruction of his home by the condemnation of all stables having wooden floors and improperly constructed manure and feed bins. But this procedure is slow and cumbersome under the existing laws, and to overcome this an ordinance is about to be proposed that covers this detail and which if passed will remedy the evil now existing in stables.

The second measure spoken of, to wit: cutting off the food supply, is perhaps the most important, for even with a home, the rat must starve or leave the locality if it cannot obtain food, and in a city situated as San Francisco, this should be a municipal problem and so regulated that the burden of cost and removal of garbage, which is the natural food of the rat, be taken care of by the city instead of the manner at present employed.

This problem could be very easily solved by placing the burden of removal of house refuse and garbage upon the property owner and not upon the tenant. In fact, the cleaning of the streets and the removing of garbage, refuse and manure should be under the jurisdiction of either the Board of Works or Board of Health. This would insure getting all of the garbage and waste and would produce a state of cleanliness not obtainable under existing conditions. For the adoption of such a plan every physician should lend his aid and influence.

Next in importance to the eradication of the rat is the obliteration of the refugee cottage, an evil which will cost the city many thousands of dollars before it is rooted out. That section of North Beach, with all the contiguous area, is especially menaced by these cottages, and with the notorious favorable surface soil for the hatching of fleas, the lack of general sanitary conveniences makes this our most important field for work. The cottages should

be routed out, and especially should this apply to the section from Presidio to the Park between 13th and 14th avenues, Lobos Square and Telegraph Hill vicinities, where they should be vacated, destroyed and grass plots made of the surface areas.

The installing of a salt water system would insure us not only against fire, for which it would be primarily intended, but afford an abundant supply of water for the sprinkling of streets and the flushing of sewers.

AMPUTATION BELOW THE KNEE JOINT.

By ANDREW M. HENDERSON, M. D., Sacramento.

Although the technic of amputation is well understood and the performance of the operation is generally considered simple, none the less the results vary so greatly that we cannot but feel that there is good reason for giving some time to consideration of the various details. This operation does not always come to the surgical specialist. The occasional operator or physician less accustomed to operative technic may find himself forced to perform the operation and under circumstances far from favorable for obtaining ideal results. Unless he is mindful of the essential points in the detail of the technic, he is quite likely to realize some of the difficulties of the procedure before the patient obtains a satisfactory artificial limb.

The first aid given to patients suffering from injuries which are likely to result in amputation is a very important factor in the result. The limb is quite likely to have dirt and gravel ground into the soft parts. The soft parts are contused and lacerated, a condition most favorable for accepting the infection to which they are greatly exposed. The limb should be bared and cleaned as well as the circumstances will permit. A moist antiseptic dressing should then be applied, to serve as a protective dressing as well as to render the exposed parts sterile. To control hemorrhage, unnecessary force must not be used. Frequently a compress applied without great force may be sufficient. If a vessel is exposed it should be clamped to check the flow of blood.

It may be necessary to apply greater force in such a manner as by application of a tourniquet. When such is the case the attendant must use some judgment as to the location of the tourniquet. The force should be applied as near to the extremity as possible, and should be no greater than is necessary to control the bleeding. These suggestions might seem unnecessary were I not to explain that during the last two years I have seen several cases brought to the hospital without any effort having been made to cleanse the injured parts, but with a tourniquet bound tightly around the limb at the site to be chosen for amputation. It is not uncommon to have these patients enter the hospital crazed by alcohol, as much as a quart bottle of whisky having been given to the patient in transit to the hospital. A patient in such a condition is not a fit subject to be given an anesthetic, nor is he capable of listening to

reason relative to the procedure to be undertaken. When alcohol is given it should be within reasonable limit. Strychnin is a better stimulant, and morphin a better anodyn. The decision as to final course of treatment is frequently very difficult. There has been considerable discussion as to the propriety of the different amputations of or through the foot.

Every surgeon has at some time questioned the propriety of sacrificing so great a part of the limb when it might seem that an amputation through the foot might suffice. It is not to be wondered that the patient opposes such advice.

C. B. Clapp, of Moberly, Mo., has recently reported the replies of 96 surgeons and 35 limb makers to questions as to the advisability of making various amputations through the foot, and as to the ability of the limb makers to provide artificial limbs for such stumps. A considerable majority, both of surgeons and of limb makers, advised the Lisfranc operation when such is possible; however, a very respectable minority opposes even this operation. The Chopart, Pirogoff, Symes and the operations through the foot were advised against by a large majority of surgeons as well as limb makers, because of the inability of the stump to bear the weight of the body and the impracticability of adjusting a useful artificial limb. In answer to the question as to the selection of site for amputation when the foot must be sacrificed, most of the surgeons and all of the limb makers advised a point from 8 to 9 inches below the lower border of the patella. In questioning men wearing artificial limbs, I have generally found those best satisfied whose limbs have been amputated at this point.

In a case where the foot is crushed and the tissues of the upper part of the leg are not bruised, it becomes possible for us to select the method of operation. The preliminary preparation of the limb should be of the most careful character. It should be washed thoroughly and the hair should be carefully shaved, and where it is impossible to cleanse the distal part thoroughly, it should be wrapped in sterilized cloths so as to prevent the soiling of the cleansed portion. I note this especially because of the tendency to hasten the preparation of the limb for amputation.

The tourniquet should be applied above the knee joint and kept in position until the flaps are adjusted, and such vessels as are easily located have been taken up. Under such circumstances we would advise the use of the long anterior and short posterior flap method, cutting the skin flap from without inward through the muscle to the bone, holding the knife in an oblique position so that the thinnest part of the muscular flap is nearer to the skin incision. It is well to make a periosteum flap, but it is useless to do so unless some of the muscular tissue is retained with the periosteum as the periosteum receives its blood supply from the muscular tissue. Having elevated the periosteum and retracted the muscles by means of the three tailed muslin retractor or similar device, the fibula is divided

first, at a point one-half to one inch above the site for dividing the tibia. In order to round off the tibia it is well to make an oblique section along the anterior ridge of the tibia, to remove the new, and then re-enter the saw perpendicular to the axis of the tibia. It may be well to place a few sutures in the periosteum flaps, and also to bring the muscles together by means of sutures so as to destroy the dead space. Nerves and tendons should be drawn down as far as possible. Cut so that the veins will not be caught in the scar. When properly cut, the skin flaps adjust themselves easily. For closing skin wounds we would use a few silk worm gut sutures and make a fine adjustment by means of horsehair. The stump resulting from this amputation is regular in outline, the scar is narrow and clean, and it is behind the bone and receives none of the pressure.

An ideal closure may be made without drainage, but it is so difficult to check all of the oozing that it is generally well at least to place a piece of drainage tube at each of the lower angles of the wound. A little extra time cannot be spent to better advantage than in controlling the bleeding on the stumps, as secondary hemorrhage is quite likely to destroy the stump, or at least necessitate the opening of the wound and make the condition very embarrassing. The limb should be placed on a long post splint, care being exercised to avoid pressure on the wound. It is not always possible to select the method of operating, the soft parts being injured to such an extent that economy must be practiced in the adjustment of the flaps. In such cases it is of first importance to divide the bone at such a point that we may have ample flap for covering.

Unless we have ample skin for covering, we are quite likely to find that the skin will be drawn upon in several points at least, and if the whole flap does not slough, part of it will, which will be difficult to heal and will leave tender spots in the stump.

REPLACING OF BONE AND CARTILAGE OF THE SEPTUM AFTER ITS SUBMUCOUS RESECTION.*

By EDWARD CECIL SEWALL, M. D., San Francisco.

In nasal surgery few conditions have received more attention than the deviated septum. The correction of this deformity, so often of such importance to the wellbeing of the patient, has been done in almost every conceivable way. I do not wish to go over the situation as it has stood in the past or as it stands to-day. Suffice it to say that we have a method, the submucous resection of the septum, that is familiar to us all, and one that gives results. Although a comparatively new operation when considered in its entirety, it has been used in a marvelous number of cases. Many able papers have been published describing it in detail and though the technique differs some in different hands, the principle of removing the offending deviated or thickened portions of the septum, whether cartilage or bone, at the anterior nares or near the choanae, is the same.

Personally I follow Professor Killian's method in making the single, slightly backward curving incision, and use his simple and effective armamen-

torium. Anaesthesia is produced by the submucous injection of cocaine and adrenalin—using the small tablets prepared by Parke, Davis & Co. The injected fluid not only gives us the effect of the drugs most effectively but we gain a mechanical advantage, as it raises the mucous membrane. The operation is made much more difficult when done under general narcosis. The hemorrhage then is hard to control and delays the operation.

Although the operation has met with almost universal favor, there have been objections raised which must be carefully considered. The point that strikes one first is the possibility of the sinking of the dorsum of the nose. This objection has been pretty well disposed of because of the very few such instances which have occurred in a great number of operations. As great conservatism as expedient is observed in removing the deflected parts.

However, the permanent removal of so much of the septum is a disadvantage if we can accomplish the desired results without so doing. This wish to preserve these healthy though misshapen parts has led me in the past nine months to try to replace as much of the septum as advisable after I have previously removed it.

Cases where the parts are to be replaced must be selected carefully, for in narrow noses we wish the septum to be left as thin as possible. However, there are many cases where after the septum is straightened, there is ample room for one of normal thickness.

After removal of the cartilage, which is done in one piece by Ballinger's knife, the bony parts are resected in as large pieces as advisable. They are kept in a sterile pan not touched or washed. When the operation is finished they are trimmed where necessary to make them straight; also to make them lie flat, and packed, the bony pieces first, carefully into the space between the mucous membrane. The raw surface of the mucous membrane on the uncut side is usually moist enough to hold them in place until all are adjusted, and the opposite membranous wall allowed to close down on them.

The nose is then packed firmly on both sides to prevent hemorrhage and hold the parts in the desired position. The packing is removed on the following day.

Since last September, I have selected seven cases where it seemed advisable to replace the parts. In none of these cases have I had any infection or untoward symptoms. The resulting septum was as straight as when the parts were not replaced. Two of these cases I have observed in the past few days. Of these cases, one shows practically a reconstruction of the structure of the septum. It is firm both to touch of probe and pressure of finger. It appears quite as firm as a normal septum. It lies in the medium line and allows the patient ample breathing space. There is no question in this case that the firmness of the septum is due to the replaced bone and cartilage.

In the other case recently observed, the septum also shows very clearly the support of the underlying bone and cartilage. By placing the thumb and finger into the nares, the thickness and resilience of the cartilage can be distinctly felt. The anterior bit of cartilage which was not removed is made out, and on tracing it backward to the line of the incision, it is felt to join firmly with a large piece of cartilage, which is joined firmly in its turn with the bony structures below, above and behind. Below these, at their anterior part, there is a small area where the mucous membrane is quite loose, showing total absence of cartilage, or support.

The problem of regeneration of bony and cartilagenous parts resected is an interesting one. To quote from Dr. C. M. Hurd's article in the Journal of the American Medical Association, Vol. XLVIII, page

115:—"The question now arises, do the cartilage and bone regenerate?" "They do not," he says emphatically. "After a period of from one to two years I have examined most of my old cases and have found the septum flaccid to the slightest touch of the probe. From one patient of fourteen, I removed a section and submitted to microscopic examination, and found only two muco-perichondria with a small amount of fibrous tissue between them." Dr. Freer, however, in his discussions of this same paper says he is not sure that such regeneration does not take place. He calls attention to certain cases seen by him some time after operation where he was fairly certain that there was greater firmness to the septum than would be given by the periosteum and perichondrum alone. However, there is so far as I know, no positive microscopical evidence on this subject. Personally, I have examined a number of such septa long after operation and though they were straight and functionating perfectly they certainly lacked underlying support of bone or cartilage. What is more, in the cases where I did replace a considerable part of the septum, the membrane was quite lax in other parts, showing that these replaced pieces had not proliferated, and completed the frame work.

It is a mooted question whether cartilage ever regenerates except from its perichondrium. To quote Ziegler, "Regenerative growth of cartilage after lesion either does not take place at all or in such insignificant proportions as to be without practical importance. On the other hand, new tissue is built up from the perichondrium."

Dr. M. Mutsucka, in Virchow's Archive for 1904, has an interesting article in which he has quoted the ablest opinion up to that time and there was difference in them as to the above question. Fedfer, Legros, and Gudden saw the cartilage regenerating by a division of the cartilage cells. Gussenbauer, Schwalbe, and Sieveking came to the conclusion that only the perichondrium took part in the regeneration. We would not then expect any material aid in the regenerative process from the replaced parts. The question has arisen as to whether on these bony or cartilagenous parts, replaced new tissue would be lain, thus leading to increase in the thickness of the septum. The surfaces lying next the periostium or perichondium are smooth and practically uninjured, and I do not believe there is new cartilage or bone deposited there. The results after nine months do not show any such condition.

REPORT OF CASES OF HEAD INJURY.*

By O. D. HAMLIN, M. D., Oakland.

In presenting this report of cases, the question of diagnosis and treatment will be mainly dealt with, in that the diagnosis and treatment of intracranial disturbances depends on a thorough and practical knowledge of the physiological functions and the anatomical locations of nerve centers.

Traumatic injuries of the head and diagnosis of same may cover symptoms of one or more conditions, such as concussion, laceration of brain tissue, compression of brain, extradural hemorrhage and subarachnoid serous exudate. Concussion and contusion of the brain associated with minute bruising of brain tissue will exist after all serious injuries of the skull.

The symptoms of concussion are varied according to the severity of the injury. Following slight concussion, the individual is stunned. There may

be only a simple vertigo, or possibly mental confusion lasting but a short time. After a severe concussion there will follow a period of unconsciousness of a longer duration; the duration of unconsciousness depending upon the amount of injury to brain tissue. The sphincters may be relaxed and consequent involuntary micturition and defecation. The pulse will become slow and feeble along with the general systemic depression. The pupils still react to light. The temperature may be subnormal. It is impossible clinically to distinguish between concussion and contusion of the brain.

In serious laceration of brain tissue the symptoms of concussion may be present to a marked degree and will be characterized by immediate, pronounced and long-continued unconsciousness, often overlapping into unconsciousness produced by intracranial hemorrhage; moreover, in laceration of brain tissue, after recovery from the initial shock, fever may be present, which may rise to 103 or 104. Concussion alone is never associated with fever. Early fever is always the sign of laceration or lesions other than concussion. Mental irritability and restlessness will mark returning consciousness. Slight hemorrhages do not give us symptoms of compression, neither do slight depressions of cranial bones. In one case called to my attention, in which there existed hemorrhage from the middle meningeal and compression of the bony vault, no symptoms of compression were caused and patient was about for six days. Before symptoms of compression appear the cranial contents must be impinged upon to a very considerable extent. In extradural hemorrhage the most important symptom of traumatic intracranial hemorrhage is the interval of consciousness that exists from the time of the injury to the onset of unconsciousness. This period of consciousness may be preceded by the temporary or prolonged unconsciousness of concussion. In my opinion, in cases of hemorrhage which occur without an interval of consciousness, unconsciousness coming on immediately upon receipt of the injury, it must be that the injury is so severe that the unconsciousness caused by the concussion and laceration of the brain is continuous with the unconsciousness from hemorrhage. Therefore, with unconsciousness of long duration, when the temperature begins to rise, the pulse becomes slow and full, stertorous breathing sets in, the face is flushed and there is loss of reaction of the pupils and signs of paralysis of the upper motor centers or special senses, we must consider that the unconsciousness of concussion is continued over into the coma of compression. The sources of intracranial hemorrhage, whether from the middle meningeal or the middle cerebral, the veins of the pia mater, from the sinuses of the brain or from the lacerated brain tissue, can not be easily differentiated short of operative procedure. There is one condition not to be overlooked in connection with the question of hemorrhage, namely, the period of semi-consciousness,

which sometimes follows concussion and laceration and gives rise to the suspicion of some more serious lesion.

For instance, J. G., aged 38, struck by one electric car while riding on the step of another, when seen at the hospital one-half hour later, was unconscious. There were no evidences of hemorrhage, no convulsive movements, no deviation of the eyes and no disturbances of the pupils; breathing was regular and normal and there were no disturbances in sensation or reflexes. Two hours later, the patient became partly conscious, knew his partner and recognized him sufficiently to tell where the key of the safe was. Twelve hours later and after a few hours' sleep, he became unconscious and symptoms of paralysis developed on his left side. In this case it may be seen that a period of nearly twelve hours' consciousness followed by unconsciousness might have been varied by a longer period of unconsciousness from concussion or the hemorrhage appearing earlier.

In fractures of the base of the skull, it is not uncommon to discover that what in the vault appears to be a simple fissure continues down to and involves the base of the skull. Fractures of the base of the skull are, however, regarded as more serious than those of the vault, because the cerebral disturbance is more pronounced, vital parts are endangered, and these fractures open into cavities which it is impossible to keep surgically clean. Danger of septic infection in such fractures is very great. According to McEwen, about 85% of basic fractures originate in the vault—that is, are caused by an extension of a linear fracture of the vault to the base.

In fracture of the base, hemorrhage may take place from the ear, from the mouth, from the nose or under the conjunctiva. Escape of cerebro-spinal fluid may be noticed from the nose or ear. In diagnosis of fractures of the skull, the signs usually present in fractures elsewhere are not available for diagnostic purposes. The hemorrhage is frequently so distinctly circumscribed as to mislead one to mistake the unresisting soft area which solidly defines margins for a depressed or even penetrating fracture. Hemorrhage from the ears may occur from other causes, such as injuries to the external auditory canal. When hemorrhage exists from the nose or ear, it may be accompanied by cerebro-spinal fluid and if collected, the presence of sugar may be demonstrated. It is also characterized by an extremely small amount of albumen and a relatively large amount of sodium chloride.

The differentiation between concussion and compression are fairly clear. In the case of concussion, the invasion is sudden, while in compression, it is usually slow. In concussion, the pulse may be slow and likewise feeble, while in compression, the lessened pulse rate is not marked by a corresponding diminution of force. In concussion, the pallor of the surface is marked, while in compression, the natural color is maintained. The respiratory act in concussion is not affected, while in compression

the vagus center is often most decidedly affected. In concussion, the pupils respond to light though they may be unevenly contracted, while in compression, they are fixed, usually dilated and do not respond to light. Unconsciousness is common to both conditions, except in concussion unconsciousness is immediate, in compression later, unless one condition overlapses the other. Should symptoms of concussion persist, however, beyond those of the simple and temporary stun, artificial heat or administration of hot alcoholic drinks by the mouth, if the patient can swallow, otherwise by the rectum, inhalations of aqua ammonia or injection of 1/100 gr. of atropin to increase arterial pressure, or inhalation of nitrate of amyl to lessen the resistance of blood through the smaller vessels and capillaries. Under no circumstances should ice or cold water be applied to the head during this stage. As soon as re-action is established, all stimulating measures should be abandoned. With excessive re-action, the new line of treatment is indicated. Fullness of the cerebral vessels are indicated by a flushed face. Congestion of the conjunctiva and throbbing of the temples is to be met with the application of ice and cold compresses, at the same time the administration of active cathartics to lower blood pressure.

The treatment of compression of the brain depends upon its causes. The cause being removed, the brain usually recovers its functions, if its nutrition has not been disturbed. As a rule, ligation of small vessels causing hemorrhage of the brain is not necessary. Should it persist, however, the removal of a sufficient amount of bone to enable the vessel to be reached will be indicated and may be rapidly affected with Keen's gouge forceps, as the removal of bone even in the linear form causes very little callus during the process of repair. This is ascribed to the immobility of the fragments and subsequent very slight irritation present. This also explains the usual but not constant absence of symptoms of cerebral irritation, such as follow the presence of deposits of new bone in the inner surface of the cranial bones. Cases, however, occur in which disturbances of function result from the formation of bony deposits in this location and operative procedures are necessary for the relief of these. Complete regeneration following the loss of bone, either from accidental injury or from the use of the trephine, almost never occurs. The dura mater here assumes the function of a periosteum to a minor extent, as shown by the fact that excessive formation of callus, under these circumstances, is almost unknown.

The question of how to lower blood pressure during operations on the head has been a very broad one and has been very widely discussed. Bleeding has been suggested, sitting the patient in an upright position has been suggested, and recently Dr. Robert H. M. Dawbarn of New York has written an article entitled "Sequestration Anæmia in Brain and Skull Surgery."[1] His method is as follows: Tourni-

1. In the February, 1907, number of "Annals of Surgery."

quets are placed around each thigh and arm close to the trunk, a towel being placed under the tourniquet to cause pressure of a wider area. It must nearly stop the venous but not the arterial current. In this way the patient is bled into his own limbs. Dr. Dawbarn, in his paper, states the danger of prolonging the use of this tourniquet during this operation.

Case I. W. C., injured August 18, 1906. Seen at hospital at 1:45 p. m. Temperature 99.4. Pulse 80. Injured about 8 p. m. the day previous, August 17th. Contusion and laceration of scalp above right ear about two inches in diameter. Patient had been up and around during the day of August 18th, but was rendered unconscious for about two hours after injury on August 17th, which occurred from being hit by switch engine at railroad yards. Pupils equal and reacted to light. Respiration normal. Heart action regular. Pulse full. Examination of injury showed slight laceration of scalp over right ear and great tenderness on pressure and a large bulging mass about two inches in diameter containing fluid. Horseshoe-shaped incision of scalp revealed a large hematoma and several loose fragments of temporal bone. On removal of depressed fragments a very profuse hemorrhage followed. Loose fragments were quickly cleared away and a large extradural clot found. On examination of dura no normal pulsation could be seen. Dura was opened and considerable effusion relieved, after which normal pulsation returned. Sharp edges of bone were carefully removed and plain gauze packing used as dressing. Following day, temperature 100; pulse 80. Patient dressed every day. One drainage strip was not removed until four days later, and then partially replaced to give additional drainage if necessary. Patient discharged from hospital September 1, 1905.

Case II. E. C., Spaniard, aged 42. Examined at hospital November 13, 1906. Was struck by street car while crossing track three days before. History showed that patient remained unconscious two and one-half hours, later returned home and was up and about, did not feel well, complained of dizzy spells and pain in left side of head when seen at hospital. Examination of head showed tenderness and bulging in left frontal region. Pulse 120. Patient was prepared for exploratory incision. Horseshoe-shaped incision was made over left frontal region. A large hematoma of scalp and linear fracture running through left frontal bone was found. Small trephine was used in line of fracture and opening enlarged by use of Keen's gouge and de Vilbus used along line of fracture. A large extradural clot was removed from under line of fracture about one and one-half inches in diameter and about one-half inch thick. Dura was exposed and did not pulsate. Dura opened and considerable serus exudate relieved. Clot and exudate were removed, wound was dressed with plain gauze and drained. Patient lifted in bed to an angle of forty-five degrees for the purpose of lowering blood pressure. Two days later the patient's temperature was 99, pulse 80 and condition generally good. Three days later temperature was normal, pulse 70. Three weeks later, patient was discharged.

Some points in this case to which I desire to call attention are the use of the de Vilbus forceps, the presence of a cerebral exudate under clots, and the position of the patient in the after-treatment.

It is easy, by running the small de Vilbus blade along a linear fracture, to rapidly open the skull for exploratory purpose and reveal a clot or point of maximal hemorrhage, and determine quickly the necessity for or point of application of the trephine.

This procedure may be carried out over any part of the brain surface without injuring sinuses or brain tissue.

When, after an extradural clot has been removed, the pulsation of the dura does not return, a sub-dural cerebral exudate is usually present and an opening to remove this exudate has not, in my experience, been followed by any serious results, unless laceration of brain tissue existed and bulged through opening in the dura. If there is danger of this complication, the patient should be carefully watched and on occurrence of a hernia cerebri appropriate treatment should be adopted.

In the treatment of injuries of the head, position is a very important factor. In concussion or other condition in which cerebral anæmia exists, the head must be low, but otherwise the head must be raised after the effects of the anesthetic have passed off, in order to lessen the tendency to hemorrhage and exosmosis due to engorgement of the cerebral vessels.

Case III. F. M., injured May 11, 1906. Inventor, aged 23 years. Fell from a buggy. When seen one hour later at hospital, fracture of lower jaw on both sides at angles. Patient unconscious. Pupils reacted to light and were equal. No manifestation of motor disturbance. Patient restless. Temperature 95; pulse 40. No evidence of cerebral hemorrhage. Stimulation treatment instituted. No attempt made to wire or reset jaws, as patient was not in condition to stand an anaesthetic. Temporary dental splints and chin bandage with large hole in center of dental splint for feeding patient used with expectation of adjusting permanent splint after patient's condition improved. At midnight on May 11th patient's condition still remained the same. Patient would take nourishment. Bowels well emptied by enema and urine drawn by catheter. Next day, the 12th, no change in physical or mental condition; temperature 96, pulse 52. At 11 o'clock, on May 12th, temperature 99, pulse 62. Patient more comatose. The next day, May 13th, at 11 o'clock, patient decidedly comatose; temperature 101, pulse 68. Patient generally in a dying condition. Patient died at 3 p. m. Temperature, just before death, 102. This patient's temperature at this time was probably due to compound comminuted fracture of the jaw, with possible infection or absorption, as tissues about fracture were severely contused and lacerated.

Autopsy showed no fracture of skull and no cerebral hemorrhage, but there was extensive generalized congestion of brain tissue, and excessive exudate into the ventricles, especially the fourth.

Case IV. M. A., Italian, November 22, 1906. Residence, Niles. Brought to me by Dr. Morrison. Examination showed equal pupils, which reacted to light. Temperature 102. Pulse 126. Respiration 38. Paralysis of right side, right arm and leg and speech. Struck, night of November 21st, about 10 p. m., on right side of head, with bottle. History shows that patient returned home three miles from Niles in his own buggy, driven by himself, unhitched his horse, put his wagon in the shed and entered his house (it was then about 11:45 p. m.), sat at the table with his wife, told her of a row with a certain man and suddenly stopped speaking. Dr. Morrison was sent for and gave him treatment during that night. Next afternoon Dr. Morrison brought the patient to Oakland and placed him under my care. Exploratory incision was made over point of injury on right side, but no depressed fracture found. Incision was carried over to left side of head, where fracture extended across the top of the vault and over the fissure of Rolando. The opening was made through

the bone over the fissure of Rolando and a large clot in the fissure exposed. The reason for the right-sided paralysis was thus evident. Clot was removed and immediately on recovering from the anaesthetic patient's leg was relieved of its paralysis. Hand and voice still remained paralyzed. Later speech greatly improved, but condition of hand was unchanged. Brain tissue being greatly disorganized from pressure of clot, of which three and a half to four ounces were removed, patient lived several weeks, but gradually became weaker and died.

Autopsy showed disorganization of brain tissue and general cerebritis.

Case V. Mrs. G. B., aged 30 years, housewife. Injured in street car accident. Seen two hours after accident in hospital. Examination revealed severe abrasion over left side of face and swelling and abrasion over left side of forehead and fracture of the acromial process of left shoulder. Patient partly unconscious. Pupils equal; react to light. Rectal temperature 96. Pulse 94. Incision across scalp revealed a linear fracture running anterior posteriorly through left side of frontal bone. Fracture seemingly very slight, no displacement of bones, no evidence of hemorrhage. Scalp wound sewed up and patient put to bed and observed closely for further symptoms. Next day, September 27th, patient very restless; partly conscious. Pupils equal; react well to light. No evidence of motor disturbance. September 28th, patient still very restless and partly conscious. Temperature 100 2-5. Pulse 100. Patient took liquid nourishment. September 28th, patient's condition about the same, but more evidence of consciousness. Pulse stronger. Recognized members of family. Patient's mental condition gradually but slowly improved from this time. Slight purgation and ice cap at this time, as the flushed condition of the patient's face, together with character of pulse, showed evidence of rise of cerebral blood pressure. At no time was there evidence of motor disturbance. The slow but gradual improvement in the mental condition kept up, and the patient left hospital November 4, 1906, with mental condition good, but very nervous and weak.

The interesting point in this case was the difficulty that arose in the diagnosis of the fracture of the acromial process in a partially unconscious patient. An injury of the right motor area by contracoup was at first suspected, on account of the disability of the left arm, but further careful examination showed that this was due to an injury of the acromial process.

In an unconscious patient and where the details of the accident are unknown, disturbance in the functions of limbs are very important aids in localizing the point of maximal cranial and cerebral injury, but it must be definitely decided by very careful examination that such a motor disturbance is not due to local rather than central injury. Sometimes, when there is no abrasion or discoloration of the skin, fractures about the hips, shoulder or other parts can be readily overlooked.

Case VI. Mrs. B., American, aged 40 years, housewife. Found unconscious on the street, October 4, 1906. Had been riding in buggy. Severe contusion of the right side of the back of head at base of skull. Patient unconscious. Pupils unequal, right pupil dilated, left pupil not so much so. Both pupils react to light. Temperature 98; pulse 60. Cheyne stokes respiration. Hemorrhage from right ear. Examination revealed no motor disturbance. Patient prepared for exploratory incision. Cavities of nose and ears thoroughly cleansed, right ear irrigated with very hot boracic acid solution and packed

with iodoform gauze. Incision made over point of injury and compound comminuted fracture of base below lateral sinus on right side about one and a half inches in diameter exposed. Fragments of bone removed and laceration of dura and subdural hemorrhage found. Sinus apparently not injured. Bony fragments and blood clot removed. Patient put to bed, given 1/50 gr. of strychnin every four hours, 10 min. adrenalin and 1/150 gr. atropin, hypodermically, and observed for further symptoms. October 5th, temperature 97, pulse 100, respiration 32. Enema given of coffee, brandy and saline every four hours. Patient still unconscious. Dressings of head showed evidence of moisture. Head redressed; large quantity of blood of watery character. October 6th, patient's temperature 100 3/5, pulse 102, respiration 30. Patient still unconscious. Passed urine and feces in bed, notwithstanding bladder being emptied by catheter every six to eight hours. No longer retained rectal nourishment. Patient had three convulsions lasting from five to ten seconds. Head redressed and a large quantity of blood again removed. October 7th, temperature 100 2/5, pulse 100, respiration 34. Six convulsions during night, lasting from one to two minutes. Head redressed; less blood. Patient partly conscious. Patient makes effort to talk, and did answer "Yes" and "No" in a whisper. October 8th, temperature 102, pulse 120, respiration 40. Patient not so conscious as the day before. Holds nutritive enema at times. Up to this time, patient was given nothing by mouth, as it was impossible to get her to swallow. Head redressed; very much less seepage. Patient's face more flushed and showing more evidence of cerebral congestion. Patient raised in bed to an angle of forty-five degrees to lower blood pressure and ice cap applied. From October 8th to October 12th condition remained about the same. Still unable to take nourishment by mouth. Eight to ten convulsions in twenty-four hours, but occurring further apart and of less severity. October 13th, patient begins slowly to take small quantities of liquid food by mouth. No convulsions. Answers questions in a very low whisper. From October 13th to 20th temperature ranges from 98 to 100. Still troubled with involuntary evacuations at times, probably once or twice in twenty-four hours. Patient's general condition improved and was discharged from hospital November 9, 1906. Last seen February 1st; apparently well.

Case VII. J. M., American, aged 27 years, clerk. Seen at hospital January 21, 1907. Injured January 20th, about 11 p. m., being hit on the head by the controller of electric car. Patient up and about all day of 21st, suddenly became unconscious at his home about 7 p. m. Removed to hospital. On examination patient showed no disturbance of motor areas. Pupils equal, respiration regular, temperature 98, pulse 100. An exploratory incision made over injury on right side of frontal region. Found depressed fracture. Removed fragments of bone and extradural clot. On opening dura considerable serus exudate. Head dressed, patient put to bed, but elevated to an angle of forty-five degrees, applied ice cap. Head dressed every day. Patient given liquid diet. Left hospital two weeks later.

Case VIII. B. L., Italian laborer, aged 42 years. Struck by runaway team, December 22, 1906, at 7:30 p. m. Examination showed fracture of occipital bone and several extensive lacerated scalp wounds in occipital region. Patient unconscious. Hemorrhage from both ears. Pupils dilated; did not react to light. Pulse 60, temperature 97. Scalp wounds were enlarged and injury to bone examined. Extensive hemorrhage about cerebellum. Loose pieces of bone, which were about two inches in diameter, removed and clot cleared away and hemorrhage apparently stopped. December 23rd, patient in a comatose condition. Pulse 126. Temperature 100. Pupils still dilated; no reaction to light. Patient delirious.

General condition much worse. Patient died at 11:30 a. m.

Autopsy showed laceration of cerebellum and extensive hemorrhage about the base of brain and in the fourth ventricle.

Case IX. K. C., aged 12 years. October 10, 1906. Injured by being struck by automobile. Temperature 98 1/5, pulse 75. Pupils equal; react to light. Extensive laceration of right cheek. Scalp wound over right parietal region three inches in length and large hematoma over median line of scalp. Child partly unconscious. Examination showed no motor disturbance. Exploratory incision made; large hematoma found under scalp in median line. Having no reason for further interference, scalp was sewed up and patient put to bed. Next day, temperature 98 2/5. Patient continued to improve and was discharged from hospital in ten days. No need for operation in such case other than exploratory incision to determine what was under hematoma.

Case X. M. L., aged 14 years. Struck by a runaway team. Extensive laceration of scalp over right parietal region. Temperature 97, pulse 128. Pupils equal. No motor disturbance. Incision revealed depressed bone 1¼ inch in diameter in right parietal region about over fissure of Rolando and extradural clot. Loose fragments of bone and clot removed. Brain pulsating. No further symptoms developed.

Case XI. F. S., aged 41 years. November 28, 1906. Injured by falling from an automobile. Examination showed pupils equal; reacted to light. Hemorrhage from right ear. Temperature 97, pulse 54, respiration 22. Patient unconscious. No laceration of scalp, but slight contusion over median line on top of head about two inches in diameter. Accident happened about two hours before. Examination showed no evidence of motor disturbance. Exploratory incision over parietal region revealed no fracture of the skull. History showed patient to be very much intoxicated at time of injury and had been so for several days. Patient put to bed to await further developments. Following day, November 29th, pupils equal; react to light. Temperature 99 3/5, pulse 125, respiration 30. Patient very restless; attempts to talk. Still can not recognize any one. General relaxation of limbs. Reflexes all diminished. November 30th, patient comatose. Pulse 130. Temperature 100 2/5. Patient generally in a dying condition. Patient died at 12:30 p. m.

Autopsy showed fracture of the right outer border of the forearm magnum at the condylar portion where it articulates with the articular process of the atlas and fracture into the anterior condylar forearm which transmits the hypoglossai nerve and a branch of the ascending pharingeal artery, the posterior condylar forearm which transmits a branch from the lateral sinus being uninjured, and very extensive hemorrhage in the cord about the medulla. This hemorrhage extended down into the spinal cord subdurally. Dr. Harvey Cushing and Dr. M. Allen Starr of New York, in the A. M. A. Journal of September 22, 1906, have suggested lumbar puncture in the diagnosis of cerebral hemorrhage of asphyxiation, of new-born infants from delayed labor. The lumbar puncture shows a bloody cerebral spinal fluid in such cases, and I think the lumbar puncture may be of equally great importance in diagnosing fractures of the base. I have used lumbar puncture and find it a good means of diagnosis of hemorrhage of base, as spinal fluid shows pressure of blood.

Case XII. J. R., aged 30 years. Injured September 26, 1906, by falling from a horse. Seen five days later, October 2nd, at hospital. Patient had been up and around until day before, October 1st. Complained of headache. Scalp wound had been dressed and sewed up by a physician who had seen him at time of injury. Had not had any treatment since.

Patient showed no signs of motor disturbance, but complained of headache. Patient remained in bed on day of October 2nd, and about 8 a. m. had a convulsion. One-half hour later had another convulsion. Was called to see patient, and during examination of wound, which was opened and stitches removed, patient had convulsion, which appeared to be Jacksonian epilepsy, wound being in left frontal region. Patient was prepared for exploratory incision. The incision was made over frontal region, which revealed a depressed bone about 1¼ inch in diameter over left frontal region and extradural clot. After removal of fragments of bone and extradural clot, brain showed no evidence of pulsating. Small incision was made into dura and considerable exudate, which seemed to be walled off about injury, removed. On removal of fluid brain showed normal pulsation. Patient showed no further trouble. Wound dressed every day. Temperature never rose above 100 and pulse rated from 90 to 110. In two weeks was discharged from hospital, convalescent.

Case XIII. Jas. H., aged 19 years, carpenter. Injured March 2, 1907. While running upstairs, hit head against joist, fell over side of stairs about ten feet and remained unconscious for a short time. Was taken home in about one hour and Dr. Koford called. Later I was called in consultation with Dr. Koford, and after head being shaved a small laceration one-quarter inch in length was found on right parietal bone about right parietal eminence. Careful examination of wound and probing showed no evidence of fracture about point of laceration, but two inches to the left of small laceration and distinct crepitus for about two inches. Case was diagnosed as a fractured skull and prepared for an exploratory incision. Exploratory incision revealed a crushed leadpencil under the scalp and no fracture of the skull.

Case XIV. N. T., aged 75 years; news agent; birthplace unknown; resident of California for forty years. Injured on March 31, 1907, at 10 a. m.

Injured by electric car; was knocked down and struck head on ground. Examination showed only slight contusion over left cheekbone. Patient unconscious; remained in deep coma until death; Pupils did not react to light; pulse about normal labored breathing; complete relaxation, with no reaction to stimulants. Patient lived about five hours.

Autopsy showed anemia of the brain, due to concussion; also a slight hemorrhage into right cerebral fossa over temporal lobe, but did not enter into the cause of death. Death due to concussion and shock.

Discussion.

Dr. J. H. Barbat, San Francisco: The localization of brain injuries is comparatively easy when they are located in the motor area, but it is quite different when the anterior portion of the frontal lobes is affected. We may have extensive laceration of the brain tissue in this region without the slightest positive symptoms. I saw a young man who fell 20 feet and landed on his hands, breaking both wrists, recover from the fractures and go home four weeks from the date of injury. Three days later, the head symptoms developed and he died inside of five weeks from the fall, with symptoms of meningitis. The autopsy showed a fracture of the base of the skull from the horizontal plate of the frontal bone to the foramen magnum. The chibriform plate of the ethmoid was crushed in and the ethmoid cells opened through the frontal bone. The ethmoid cells contained a piece of brain tissue as large as the end of the thumb; no hemorrhage or symptoms of meningities. In this case more than four weeks elapsed without the slightest symptoms pointing to the injury of the brain.

THE MEDICINAL TREATMENT OF MYOCARDITIS.*

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It is difficult to write a satisfactory article upon the treatment of any disease because so much depends upon the individuality of the patient, the extent of the tissue changes, the co-existence of complications or distinct morbid conditions, all of which tend to diminish the possibility of describing a course of treatment equally applicable to any two consecutive cases.

The treatment of myocardial lesions should not be a matter of routine practice; in each case an attempt should be made to depict the condition of that particular heart, not always to regard it as a completed process in which there are localized fibrous patches, or in which the interstitial growth of connective tissue has gradually obliterated and replaced muscle fibres, but to remember that the inflammatory process in the cardiac muscles is molecular at its inception as in all other tissues and quite as amenable to treatment, and that the fibrosis denotes the completion of the process. It would indeed be a hopeless task to treat a heart in a condition of extensive fibrosis. Nor should we forget such elementary physiological facts as that the cardiac contractions can only take place as the result of chemical changes in the muscle cell; yet, practically this often takes place, and we find a course of treatment suggested that is entirely directed to influencing the heart muscle through the vagus or sympathetic nerves, without taking any precautions towards the reconstruction or preservation of muscle fibres, regardless of the fact that nerve stimulation without muscle cells is as impotent to produce a cardiac systole as is a lanyard to fire a cannon without a charge of gunpowder.

The ideas of heart disease and drugs of the digitalis group are altogether too closely associated in the medical brain, so that these medicines, although invaluable in some cases of myocardial disturbance, are only too frequently prescribed with disastrous results to the patients. Their great danger lies in the rapidity with which the patient apparently is benefited by their administration. I say "apparently" because the unquestionable amelioration of symptoms is obtained by stimulating the remaining healthy and partially changed fibres without improving the fibres themselves so that the actual condition of the heart is masked just as the progress of other diseases is often concealed by opium. Before proceeding further let us make our position on this topic clear:

The use of digitalis and its allies in the treatment of myocardial disorders is not condemned, it is the indiscriminate use that we deprecate; within the next few minutes it will be stated that in some cases digitalis is the only remedy, in others it occupies a secondary position, while in a third class it is absolutely useless. The pre-eminent question in the treatment of this disease must always be what

can we do to improve the muscle fibre? In addition to this it may be necessary to call into play agents, medicinal and otherwise, to relieve immediate sufferings, but these latter should always aim at bringing the patient within the possibilities of his heart, not at driving the heart to meet the demands of the patient.

The subject of baths, rest and regulated exercise in the treatment of myocarditis will be presented to you by other gentlemen who participate in catering for this symposium. I would only encroach upon their domain so far as to emphasize my belief that the last is necessary in all cases, and my instructions to all patients are that they must draw a sharp line between exercise and exertion; that exercise, whether active or passive, ceases to be exercise when it produces or aggravates dyspnœa and must be discontinued until the difficulty in breathing has passed away.

Personal experience has been that the medicinal and dietetic treatment of myocardial disturbance is most satisfactorily conducted when selected according to the most prominent factor in the etiology of each case and therefore they are generally grouped somewhat in the following way:

1. Myocardial changes that are secondary to valvular lesions.

2. Myocardial changes due to infections.

3. Myocardial disturbance depending upon errors in diet and food metabolism.

4. Myocardial disorder consequent upon disordered excretions or internal secretions.

5. Myocardial asthenia secondary to the existence of neoplasms.

6. Myocarditis as a part of senile decay.

It must be understood that this is not intended to be a classification according to which the various cases can be grouped absolutely in one or other category; such a proceeding is impossible as different causes nearly always co-exist in the same patient, but generally one is pre-eminent over the others and consequently figures most prominently in directing the treatment.

1. The myocardial changes that are secondary to valvular lesions are probably the most easily treated and are best adapted to remedies of the dignitalis group. Failure of compensation in vavular lesions is not simply a matter of strain, it is really a nutritive change in the myocardium as a result of deficient or embarassed coronary circulation and must be treated as such. In lesions of the aortic valve the trouble begins as soon as the increase in muscular fibres due to hypertrophy of the left ventricle gets beyond the nutritive power of the normal coronary circulation, while in all mitral lesions the tendency from the first is to cause an increased internal pressure in the right side of the heart so that escape of blood from the coronary veins is obstructed, the cardiac muscle passes into a state of passive congestion, its nutrition is impaired and after a time degeneration of the fibres takes place. The same thing occurs in patients who suffer from emphy-

sema or asthma and explains why in such diseases both sides of the heart suffer although mechanical obstruction is only exercised against the right side.

It is very evident that under such conditions the primary object must be to relieve the ambarrassed coronary circulation, an object for which digitalis and kindred drugs are peculiarly fitted because not only do they influence the general circulation, but they are directly beneficial to the cardiac muscle in various ways: by slowing the heart they rest the muscle, by increasing the aortic pressure the blood enters the coronary arteries with greater force, and lastly the more powerful contraction of each fibre empties the muscular tissue of its passive congestion, aids in the removal of accumulated waste matter and facilitates a fresh supply of pabulum to the muscle cell. In cases where the myocardial changes are incipient this is all that is required, but in many instances the failure of compensation may have resulted in impaired function of other organs, so that substances which never should have been formed in the body, or under normal conditions would have been excreted, enter the general circulation and act as toxins on the cardiac muscle. In this state of affairs there will require to be a combination of the above treatment with that soon to be discussed under the section on changes due to faulty metabolism, or it may be that the failure has persisted so long or recurred so frequently that the changes in the myocardium are extensive and permanent and are better adapted to such a course of treatment as is recommended for the senile heart.

2. Myocardial changes due to infections. These can be divided into at least two classes, (1) those in which the changes are the result of the influence of the toxin directly upon the cardiac muscle; (2) those in which the infection affects the coronary arteries and induces secondary changes in the muscle fibres. In the first we have diphtheria, rheumatism, smallpox, typhoid fever, erysipelas, pneumonia. My own experience is that in the acute stage of such cases no remedy is so efficacious as the tincture of the chloride of iron in doses of about twenty minims every three hours. Why this particular preparation of iron should be so beneficial I cannot say, but it is the experience of many other clinicians. After the acute stage is passed, arsenic gives better results than iron. So marked is the difference that we might almost venture the suggestion that the chloride of iron influences the toxin, while arsenic exerts itself upon tissue nutrition. The latter part of the hypothesis is certainly in accord with pharmacologists, who have found that in small doses arsenic checks change and decreases nitrogenous elimination. To attain these results the drug is best given as Fowler's solution, three or four drops three times daily and continued for a considerable length of time without increasing the dose. Typhoid fever and syphilis are probably the two infections which most frequently produce changes in the coronary vessels that terminate in myocarditis. The treatment in such cases is the prolonged use of moderate doses of iodide of potash,

in the hope that it will by its alterative influence produce a healthier condition of the vessel walls, or at least delay the process of obliteration.

In the treatment of cases belonging to this group such remedies as digitalis take a second place. Since they cannot possibly have any influence upon the toxic process, they are only permissible where, notwithstanding the fact that the work of the heart has been reduced to a minimum, it becomes evident that the circulation is not adequate to the immediate demands of the body. We have then to choose the lesser of two evils, because the failure of circulation through the viscera, including the heart muscle itself, with all the consequent mal-nutrition and mechanical embarrassments, is productive of greater danger to recovery than is the careful and judicious stimulation of an inflamed myocardium. It is almost needless to say that under such conditions the dosage must be carefully watched and the influence on the heart noted from day to day.

3. It has been long recognized that myocardial disturbance is frequently the result of disorders of the alimentary system or defective metabolism, but the interpretation of the relation between the two is of more recent date. Formerly the palpitation, cardiac pain or weakness of which such patients complained was regarded as nervous in character due to some reflex disturbance of the branches of the vagus, but there is little doubt that many of them are the result of toxins upon the cardiac muscle. The physiological experiment that put this matter beyond doubt was the establishment of Eck's fistula, so that substances which should undergo further change in the liver could at once enter the general circulation; when proteids were fed to dogs thus prepared, death rapidly ensued. A recognition of the fact that imperfectly transformed nitrogenous food will result in the formation of muscle poisons that may escape through the liver and have a deleterious influence upon the heart is of the greatest importance, not only because it will explain the existence of many cases of myocarditis, but also for the reason that it indicates the dietetic rules in all cases of the disease. The first effort in the treatment of cases of myocarditis due to alimentary disturbance should be to ascertain where the dietetic error has crept in, for although the muscle poisons are mainly the result of proteid metabolism, it does not necessarily follow that the patient receives too much proteid material; more frequently the trouble is due to interference with digestion or assimilation, and consequently it behooves us to find out where the flaw is, whether it lies in an excess of nitrogenous food, or the form in which it is taken; or the nitrogenous food may be all right both in quantity and quality, but the hydrocarbons or carbohydrates be in excess or of such a nature that they disturb digestion and thus prevent the digestion of an amount of proteid material that is absolutely necessary to the best welfare of the patient; or there may be absence of some of the gastric or intestinal ferments, so that the food does not go through the preliminary chemical processes essen-

tial to its future metabolism; or there may be changes in some of the other viscera, such as hepatic cirrhosis, which diminishes the activity of the organ, and imperfect metabolism results. It is only after such an inquiry as the foregoing that it is possible to say what constituents of the dietary or what organs are responsible for the symptoms and physical signs presented by the patient.

While it is therefore necessary to arrange the diet according to each individual case, there are certain general instructions which may be given to all regarding articles of food to be avoided, intervals between meals, and other matters that are of great importance to secure perfect digestion and metabolism: (1) The daily amount of food should be divided into three meals, all nearly equal in quantity; but the articles that are most difficult of digestion should be taken at the midday meal, and the lightest in the evening. The custom of taking one very hearty meal in the day is to be condemned, especially if that be taken in the evening, while breakfast consists of a little fruit and lunch of a cup of soup and a biscuit. The objections to this common dietetic habit are that it overcharges the blood with a large amount of nitrogenous waste at one time, and furthermore that the stomach will not have time to complete digestion; if, on the other hand, the amount of food be divided up more equally throughout the day, then the waste matter in the circulation is less liable to be in excess of the capabilities of excretion. (2) The meals never should be less than four hours apart, so that the stomach can empty itself and rest before it is called upon to dispose of more ingesta. (3) No food should be taken between meals. (4) A glass of hot water should be taken every night upon retiring, as this is the best way of flushing not only the stomach but also the liver. (5) Alcoholic stimulants should be avoided if possible, but if they must be given, then whisky and water, or a light Moselle wine are to be preferred. Champagnes, sweet and heavy wines should be forbidden.

The medicinal treatment must depend upon the particular flaw in the alimentary system; it may be necessary to give some aids to digestion, such as nux vomica and one or more of the digestive ferments, but personal experience is more in favor of a line of treatment by means of alteratives, especially some form of mercury. The effect of mercury in myocardial troubles is not sufficiently appreciated; the benefit is not simply a result of purgation that could be accomplished equally well by a saline or any other cathartic; not merely the removal of dropsy and œdema, so that respiration is less embarrassed, but clinical experience from before the days of our grandfathers to the present time testifies to the value of mercurials where none of these conditions exist, and records cases of angina pain and precordial distress relieved by their administration. No doubt the improvement is due not simply to the action of these remedies upon the liver, but to an increased activity of the lymphatics and glandular system generally, so that exudates and toxins are rapidly absorbed and excreted, the blood is purified and the quality of all glandular secretions thus improved. When simply the alterative effects are desired, it is my custom to use the protoiodide of mercury in doses of one-quarter of a grain three times daily for ten days or a month, and in addition to this a saline aperient every other morning; when there is œdema or dropsy then the squill, digitalis and blue mass pill three times daily, or a grain of calomel, or five grains of gray powder given with the same frequency for several days, are better adapted to the case. When the patient is distinctly gouty, good results are obtained from colchicum.

So soon as there is reason to believe that the alimentary disturbance has been corrected then an attempt should be made to rehabilitate the muscle fibres, and this is best done by means of arsenic. This remedy should be given for a length of time in small doses, and irritability of the stomach may be overcome by putting four or five drops in a tumblerful of water and instructing the patient to sip this amount in the course of two or three hours. It may be necessary in some cases to use digitalis in addition to the above named remedies, with the object of relieving coronary stasis, but this drug will not have any effect on the myocarditic process and will utterly fail in furnishing relief unless given simply as an adjunct to the alternative and dietetic treatment.

The amount of time at my disposal prevents anything but the most brief summary of the treatment of myocardial changes consequent upon disordered excretion or internal secretions. While medicinal measures may palliate the suffering of the patient, they rarely accomplish anything of a curative or even retarding influence on the case itself.

Bright's disease is probably the most prominent example of disturbed excretion exercising a deleterious influence on the cardiac muscle, and many theories, such as mechanical obstruction in the kidney, loss of internal renal secretion, have been promulgated to account for the cardio-vascular changes, but as none of them have stood the tests of clinical observation or laboratory investigation, we are forced to ask ourselves whether the myocardial changes are secondary to those in the kidney, may they not with equal justice be regarded as part of the same process. The progressive character of nephritis simultaneous with the cardio-vascular changes, the fact that high blood pressure has been demonstrated in the retina coincident with or it has been claimed antecedent to the first evidence of renal disturbance, the multiplicity of exciting causes such as scarlet fever, alcoholism, gout, etc., all of which frequently produce changes in other tissues without any evidence of the kidneys being affected, suggest that the relationship between Bright's disease and myocarditis is one of common cause not of sequence. Croftan's experiments upon rabbits give color to this hypothesis, because he found that frequent injections both of xanthin and hypo-xanthin produced nephritis, cardiac hypertrophy and thickening of the blood vessels due to small

cell infiltration of the intima and adventitia. As both of these substances are derivative of proteid metabolism, they would indicate that the curative treatment of the disease, under this theory, must lie in the regulation of nitrogenous food, that this form of myocarditis must be treated in a way analogous to that due to disorders of the alimentary system and defective metabolism, and this is just where the clinician has placed it for many years; for further progress we must wait until the labors of the chemical pathologist have furnished us with the knowledge necessary to the selection of an appropriate armamentarium.

Diseases of the thyroid gland furnish us with the best example of myocardial disturbance due to disorders of internal secretions. When the cardiac disease is the result of diminished thyroid secretion, as in myxœdema, it is easily remedied by the continual administration of thyroid extract in amounts varying with the exigencies of each case. Prior to the discovery of this method digitalis, strychnine, arsenic and many other remedies were tried ineffectively and the patient drifted slowly to death or insanity.

When the secretion is in excess our hope for relief lies in one of two things, either the spontaneous arrest of the disease or destruction of the gland. Personal experience has been that far more cases were arrested spontaneously without any medical treatment than were improved by ointments, galvanism or any internal medication. Serum and X-ray have yet to establish themselves. In the earlier stages the distressing symptoms are frequently mitigated or relieved by the use of cardiac tonics because the muscle cells are still responsive to their influence, but notwithstanding their use the muscular changes go on unretarded, unless the thyroidism itself is arrested by one of the methods above mentioned, until a stage is reached when the myocardium is absolutely irresponsive to digitalis, strophanthus or any other cardiac tonic. The only hope for the medical cure of this form of myocarditis lies in the discovery of some agent that will control or counteract excessive thyroid secretion.

Cardiac asthenia associated with disease of the suprarenal glands is likewise intractable to treatment. The fact that epinephrin has failed to produce any benefit has made the outlook even more hopeless and has given rise to the idea that epinephrin is neither an antitoxin nor a ferment concerned in metabolism; but that toxins exist in the blood which are normally attached to the suprarenal glands and there destroyed, and that epinephrin is a secretion whose purpose is to modify the blood pressure in the gland according to the demands made upon its activity.

Myocardial changes are frequently due to the existence of neoplasms, but time permits me only to remind you of the role played by uterine myomata in this respect. In the Toland Memorial Lectures for 1904 the subject was discussed at greater length than can be done at the present time. In some instances the change may be secondary to anæmia, but in many others there has not been any hemorrhage, nor does anæemia exist. Thus one patient gave the

following blood count: Red cells, 4,700,000; leucocytes, 8,000; numerous blood platelets; hemoglobin, 66 per cent; color index, 0.70. Appearance of blood cells normal. No parasites found. Differential count: Neutro-philes 81 per cent; small lymphocytes, 17.5 per cent; large mononuclears, 1.5 per cent; eosinophiles, 0.0. Kessler believes that the dense tumor so increases the resistence to the blood stream that myocardial changes are a consequence; in one of the cases observed by me the cardiac symptoms began when the tumor was no larger than a walnut, so that there could not be any great increase in resistance, and only ceased with removal of the tumor. Fleck suggests that the myocardial changes and the tumor are due to an abnormal secretion from a diseased ovary; to establish this theory we must have statistics showing what particular ovarian disease yields this abnormal secretion, and in operations, where the heart improved after removal of the fibroid, it should be stated whether the ovary was taken away at the same time. In some cases temporary improvement follows the use of iron and arsenic in combination, but where the malady is associated with progressive cardiac weakness surgical measures should not be delayed until it becomes a question whether the heart is able to endure the strain of the operation. Senile myocardial changes are most frequently the result of an endarteritis gradually obliterating the small coronary arteries and producing degenerative changes in the muscle fibres from defective nutrition; but this is not entirely true, for many cases of senile myocarditis improve upon a restricted diet, which would indicate that the cardiac weakness was not so much due to degeneration of the fibres from diminished blood supply as to their intoxication from excessive or improper pabulum, and hence the rapid improvement when this is withdrawn. Everyone must have noticed that the majority of old men who enjoy good health are frugal in their habits. Eating has become such a social custom instead of a means to maintain life that most people fail to recognize that with increasing years the demand for food for purposes of growth and repair gradually diminishes, but go on eating the same quantity as they did at the age of twenty-five or thirty, unless personal discomfort on account of obesity or indigestion compels them to reluctantly deny the gratification of a palate which it has cost them much to educate. The dietetic suggestions made on the section on disturbance due to faulty metabolism applies with greater force to the patients in the present group. Indeed the closer the diet of the man of 60 resembles that of the boy of 6 the better it will be for his heart.

If the tissue changes are extensive it may be necessary to use cardiac tonics such as arsenic, strychnine or even digitalis to maintain the circulation and prevent coronary stasis. In the use of numbers of the latter group the greatest care must be exercised, the drug given in small doses, and the effect upon the periphereal vessels closely watched. The necessity for this lies in the fact that the blood vessels generally may respond to digitalis very quickly and by

their contraction increase the resistance to the cardiac systole so much as to cause the greatest distress to the patient and place him in actual danger. Under such conditions my custom is to give digitalis and nitroglycerin at the same time, keeping the two drugs separate and varying the dose until the necessary driving power of the digitalis is obtained while the arterial contraction is sufficiently antagonized by the nitroglycerin.

TREATMENT OF HIP-JOINT DISEASE.

By W. LE MOYNE WILLS, M. D., Los Angeles.

The part in this discussion, which has been assigned to me is the operative treatment, after that by fixation and traction splints and the acute process has passed—and the complications and results of coxitis remain.

Abscess—Is a very frequent complication of hip disease occurring in about fifty per cent of all cases. In those cases in which appropriate treatment is instituted early, not more than twenty per cent suffer from abscess, according to Gibney. Abscess usually results in sinuses which may discharge for a time and eventually heal. A common seat of abscess in hip disease is on the upper and anterior part of the thigh, external to the femoral vessels, but they may occur elsewhere, on inner aspect of the thigh, in gluteal region, or if acetabulum is perforated, above Poupart's ligament in perineum, or open into the bladder or bowel.

In cases of hip disease of long-standing suppuration, the patient may develop progressive emaciation and amyloid changes in liver and kidneys, attended with albuminuria, and anasarca, usually soon followed by death. Abscess may form slowly or rapidly and attain such size as to interfere with wearing apparatus. When pus is diagnosed, it should be aspirated or evacuated by incision. Gibney holds that the most satisfactory results follow repeated aspiration or small incisions, followed by injection of iodoform emulsion, and closure of wound by compresses of gauze, to be repeated as often as cavity refills. The cavity and sinus, in spite of any method, will remain open and discharge until all debris is thrown off from diseased bone and cartilages. Old sinuses should be opened up and curetted, after which they will often rapidly close.

In tuberculous ostitis of the hip, when the process is limited to well defined foci surrounded by firm bone, the condition resembles that of an abscess, and drainage of such focus is desirable, when part is easily accessible, as the knee or os-calcis; but when the epiphysis of femoral head or the acetabulum are attacked, it is difficult to satisfactorily drain or remove diseased tissue: it is not easy to determine by skiagram the existence of a sharply defined focus.

It has been shown by Feiss that tubercular changes may exist in bone in an early stage of development and on the borders of apparent tubercular cavities, and yet not be demonstrable in X-Ray pictures taken of living subjects, especially when taken in the deeper structures. This procedure is most satisfactory when process is near the trochanter, which may be trephined or tunneled for removal of detritus or sequestra.

The operation is performed by exposing the part of bone in which the focus has been located and removing it by thorough curettage. (If in the neck or head of femur, trochanter is exposed with least amount of damage to soft parts and trochanter and neck drilled until head has been reached, or focus or pus found sooner.) The cavity, if there has been one found, after having been scraped, should be dried and wiped out with pure carbolic acid and alcohol, or two and one-half per cent solution of formalin (and wound closed all but temporary gauze wick).

Osteotomy-Gant—Where the joint is partially or completely anchylosed and the leg fixed at a bad angle to the trunk, correction by osteotomy of femur, will diminish deformity when walking, and give greater length to leg. Gant devised this operation in 1872, dividing the femur below trochanter minor. His method has been modified, some using the chisel, others the saw. The only instruments needed are a chisel properly tempered and wooden mallet.

(The patient aseptically prepared, on back or side, sand pillow under leg, chisel is driven into leg, cutting edge being entered in long axis of limb and turned when it pierces periosteum, and then enters the bone, at a right angle.) The chisel should be driven into bone by sharp blows with mallet. The bone should not be entirely divided and when evident that only a shell remains, very little force will make a green stick fracture, and leg be brought to a proper angle to trunk. No manipulation of bone should be made after the partial fracture. It may be necessary to divide bands of contracted fascia in upper thigh to completely extend limb. A properly protected and applied plaster spica is put on to hold the leg in corrected position. All bony prominences must be carefully padded to prevent sloughs. If plaster cast is undesirable, a bed frame with traction or a double Thomas' splint may be used. Confinement to bed for five or six weeks.

If it is desired to compensate for bone shortening, it can be done by putting the leg in an abducted position. Risks attending operation are slight. Hemorrhage is very rare, though accidents have been reported from pressure on femoral vessels by sharp edges of bone. Marked improvement in general condition often follows operation after patient leaves bed. Fixation in plaster splint should be continued six weeks longer. Fixation must not be abandoned too soon as relapse occurs.

The ultimate functional results are excellent and though there may be no motion at hip joint, the lumbar vertebræ are more movable and patient walks with less lurch and deformity. The operation is indicated in all cases of severe deformity in which the distortion seriously interferes with locomotion.

Mr. Robert Jones of Liverpool does a modification of Gant's osteotomy; instead of a chisel and mallet, he uses a pistol shaped saw whose narrow blade ends in a probe point with which he saws

through shaft of femur just below junction with neck, outside intertrochanteric line. He makes a small incision with a slender knife to the bone, passes saw through this channel and very quickly cuts through bone, breaks lower shell of femur, puts leg in best possible position to correct faulty angle, slightly abducts leg and puts patient up in a double Thomas' hip splint. Mr. Jones claims he gets better results than with chisel; that bone dust is taken care of and that end results are excellent.

Excision of Hip Joint—This method of treatment is based on the opinion that in a tuberculous joint lesion, repair is hastened by removal of diseased portion. Excision is less to be advocated on the hip than at the knee or ankle, because it leaves a poor joint for weight bearing purposes, and because it is difficult to remove acetabulum, frequently primarily diseased. Excision in early cases is not justified if conservative treatment can be continued for a sufficient time, and with thoroughness. The hip is more mutilated than by cure by natural process of gradual absorption and repair, which leaves a more or less anchylosed hip, consequently excision is reserved for the severer cases.

The value and efficiency of excision of the hip has been much disputed. Two of the most noted authorities on hip disease in England, Mr. Howard Marsh of the Great Ormond Street and Alexandra Hospital for hip disease in childhood, and Mr. G. A. Wright of Manchester and the Pendlebury Hospital for Sick Children take diametrically opposite views.

Mr. Marsh is strongly opposed to excision for the following reasons: He considers the results obtained by continued rest to be such as to render excision totally uncalled for. Thus continued rest gives a mortality of only five per cent. Seventy per cent of cases thus treated recovering with only slight lameness, and loss of movement. Even when suppuration has occurred, the mortality is only six to eight per cent.

On the other hand, Mr. G. A. Wright, speaking from a larger experience of over one hundred cases of excision, of which *only three* at most, died of direct result of operation, strongly urges that the hip should be excised as soon as there is evidence of external abscess, and still better results would, I believe, be obtained by operating before the pus has escaped from the articulation. The operation is discredited because it is put off until disease is so far advanced that no treatment can have more than a fraction of good results; while timely excision cuts short the disease, saves pain, lessens the time of treatment, and gives a better limb.

Again Mr. Wright says, "While fully aware that abscesses disappear, and tuberculous lesions cicatrize under favorable circumstances, I think that in case of the hip, delay is unwise amongst the hospital class, with whom it is impossible to deal on the same terms as with the well-to-do. In almost every instance, I have found much more extensive disease than might have been expected from the external evidence unless the pathology of affection is born in mind; and I believe that once this chronic osteomyelitis is established, nothing short of excision can *in hospital cases* prevent the ultimate progress of the disease to abscess, and too often to gradual exhaustion of patient by pain and discharge. Nature, of course, in many cases will, unaided, get rid of dead bone by slow and tedious processes, but the number of children who can survive the process of elimination is very small, while the mortality after early excision is not great, and the failures are mainly in those instances where the operation has been put off too long, where actual necrosis or caries of head of the femur with destruction of bone and cartilage and sequestra of varying size in the acetabulum, or at least caries of it is known to exist. I think few advocates of non-operative treatment will be found."

With reference to such a divergence of opinion between two authorities on the subject, it should be known that Mr. Marsh worked under more favorable conditions than most hospital surgeons. At the Alexandra Hospital cases were kept under treatment as long as rest and extension were required; if an operation was required, the case was transferred elsewhere. Mr. Wright on the other hand had the usual hospital conditions, and could not prolong treatment indefinitely, and hence arrived at a different conclusion. It is largely a "class" question.

If the patient can have all the care and attention for a sufficiently long time—the conservative plan will no doubt be the better one for that case. But if, as in most hospitals, where patients are from the tenement districts, and are victims of their surroundings, the question changes into, what will prevent the greatest loss to individual in suffering, time, and afford the greatest chance for a good result with least amount of deformity and danger as to life, and such considerations make Mr. G. A. Wright, and others who agree with him and who operate on the sick and poor in large numbers, adopt the more radical method, as best for hospital cases.

The slums of London, Manchester, Boston, New York, and all other large cities furnish the great mass of cases for Children's Hospitals, and upon such cases and their treatment statistics are based. Hence one hospital's experience and statistics will differ greatly with another's, depending on the class of cases, the endowment of hospital and whether the surgeon can keep his cases as long as he wishes to secure results by the more conservative methods, before proceeding to the more radical. Men's opinions are formed by habit and by their experiences, and should be contrasted accordingly.

Operation—Posterior Incision—Formerly the great advantage claimed for this method was better drainage, but the choice of method should largely depend on the location of the disease in and about hip joint, whether more anterior or posterior. The posterior operation consists in making incision over middle of great trochanter, freely exposing capsule and upper end of femur. The exact position of head and neck is made out by finger while an assistant rotates the limb.

Second incision opens capsule freely; parts being properly exposed and protected, the bone is sawed through just below top of trochanter with an osteotomy, metacarpal or keyhole saw. There must be clean sawing, and no splintering of bone. The head and neck are levered out of the acetabulum. The round ligament is probably destroyed, if not it must be divided. The acetabulum is examined and if merely roughened, is left alone; if pitting or erosion present, curetting and gouging must be resorted to. Sequestra must be removed. If acetabulum is perforated, and pus on inner aspect of pelvis, a free opening must be made by trephine or gouge and a drainage tube passed through.

Drainage by iodoform gauze or a tube will be necessary in nearly all cases. In a few where there are no sinuses, nor pelvic abscess, and after all oozing has been stopped, sterilized iodoform can be rubbed in and wound closed with sutures, dressing must be applied and firm pressure maintained.

Mr. A. E. Barker has shown what excellent results the anterior method can give and among his later papers has published some most successful cases treated in later stages, where other means had failed, and abscesses were threatening to burst. Mr. Barker claims less interference with muscles, patient can be treated and wound dressed more conveniently, with a Thomas' splint. Primary union can be secured if all of diseased structures are removed; perfect asepsis secured; all oozing checked and wound kept dry by well applied dressings; absolute rest during healing—perfect drainage can be obtained, because discharges are serous. All diseased tissues have been removed and a clean walled cavity is left, which is capable of healing by first intention, and soon femur can be brought up and thus diminish size of cavity.

Mr. Barker, in Lancet, 1900, analyzing forty-one cases, anterior excision, as to after history speaks favorably of final result. As to functions of the limbs operated on, as seen (in all but two cases) years after they were excellent.

According to Whitman the results of excision are as follows: In the twelve years, 1888 to 1899 inclusive, 149 operations of excision were performed at the Hospital for Ruptured and Crippled. During this time 1,283 cases of hip disease were treated in the wards and 1,870 new cases were recorded in the out-patient department. Thus the operation was performed in 11.6 per cent of those in the hospital, but the relative frequency of the operation in the entire number of patients under treatment, was considerably less than this.

One hundred and twenty-one of these operations of excision, or those performed prior to 1897, have been carefully analyzed by Townsend. The 121 operations were performed on 119 patients, in two instances both hips having been operated upon. In 113, abscesses or sinuses were present, in most instances infected. In 5 cases the spine was involved as well as the hip; in two instances the knee, in 2 the tarsus, in 3 the ilium. In 24 cases the anterior incision was employed, in 97 the posterior. In 18 in-

stances the acetabulum was seriously diseased and in 10 osteomyletis·of the shaft of the femur was present. This indicates the character of the disease in the cases operated upon.

In 99 of the cases the later results of the operation were ascertained. Of these 52 were dead and 47 were living. Of the 52 deaths, 9 were due directly to the operation, shock; 28 were caused by exhaustion; 9 by tuberculous meningitis; 7 by other causes. Thirty-seven deaths occurred within six months and 10 others within one year of the operation. Of the 47 patients living at the time of the investigation 26 were cured. Of the remaining number about one-half were in poor condition so that recovery could not be expected. It is evident that in a large proportion of the cases the operation was unsuccessful as a life-saving measure since suppuration persisted.

Lovett has reported the results of 50 excisions in a similar class of cases at the Boston Children's Hospital, 1877 to 1895. The number of patients actually treated in the wards of the hospital is not stated, but 1,100 cases were recorded as having been under treatment during this time, a percentage of excisions of 4.5 of the total number. In eight of the cases osteomyletis of the femur was present and in 15 the acetabulum was perforated. The ultimate mortality was about 50 per cent.

Poor has reported the results in 65 cases operated upon at St. Mary's Hospital, New York, with a final mortality of about 43 per cent. In 21 cases osteomyletis of the shaft of the femur was present. In 11 cases there was perforation of the acetabulum and in 9 of these the opening communicated with an intra-pelvic abscess.

These statistics are quoted to illustrate the relative efficiency of late excision. The extent of the lesions in some of the cases shows that recovery would have been impossible without operation, and its failure to relieve the symptoms in so many instances is sufficient evidence that it was postponed too long. Under proper conditions for treatment excision of the hip is almost never required, but in hospital practice it would seem that it should be performed oftener and at an earlier stage of the disease.

Conditions of success in excision of hip.

(1) Age, from 6 to 14 years; after 18 should be rarely done, Furneaux Jordan's amputation taking its place.

(2) Absence of lardaceous disease.

(2) Absence of advancing trouble in other joints, or of tubercular lesions of viscera, e. g. lungs.

(4) The disease must be removed as completely as possible. The section in femur must pass below all foci of disease, all sinuses must be scraped out.

(5) Adequate drainage.

(6) Careful after treatment, the wound being kept aseptic.

(7) Patient must not be kept too long on his back in hospital air.

The consensus of opinion in regard to amputation seems to be, if done early that results are superior to excision, from standpoint of general improvement

and mortality. The chief drawback, however, is the resulting deformity, which can only be partially replaced by mechanical devices. Mortality in ordinary cases is no higher than in amputation of upper thigh. If on the other hand, there are large areas involved with tunneling sinuses, and great constitutional involvement, the operation is then one of last resort with an exceedingly high rate of mortality.

INDICATIONS OF CESARIAN SECTION.*

By A. B. SPALDING, M. D., San Francisco.

The interest of the unborn child demands attention, and its life as well as its future health should be safeguarded by the conscientious attendant. To do this one must adopt a systematic method of examination of the pregnant woman and carry it out continuously. Too often this becomes a very monotonous procedure and the practitioner falls into the convenient habit of never troubling trouble until trouble troubles him. In this paper some conditions will be mentioned which occur fortunately rather infrequently, but when they do occur or exist tax the skill and the judgment of the attendant to the utmost. Conditions which demand interference to preserve fetal life without too much risk to the mother, and which are met successfully by the operation of Ceserian Section in opposition to therapeutic abortion, craniotomy, induction of premature labor, version and forceps.

Cesarian Section may be necessary to meet a sudden or unlooked for emergency of pregnancy or labor or it may be the last heroic effort to save a patient from misplaced confidence in the powers of nature, or from ill-judged efforts of the attendant to utilize forceps. The mortality of this emergency or late operation is high, certainly 50 per cent for both mother and child. The indications can not be briefly stated, as each case is an obstetrical entity in itself. One thing is clear and that is that the general surgeon performs this operation not infrequently for certain conditions which are best met by other obstetrical operations. For instance, following Lawson Tait, some surgeons have operated for placenta previa, amassing even in the reported cases a maternal mortality of over 20 per cent. It is interesting to note the reason Dr. Tait gave for his original operation. In his previous experience he had had fourteen cases of placenta previa and had lost seven of the mothers in attempting version. It is obvious that Dr. Tait was a surgeon and not an obstetrician. He was browsing in the wrong pasture.

Occasionally in placenta previa as well as some cases of eclampsia accidental hemorrhage, or sudden death of the mother during pregnancy Cesarian section is indicated, but as a general rule these conditions are best treated by other operative procedures. A case of maternal death during the last month of pregnancy from edema of the lungs complicating myocarditis, in which I performed a post mortem

Cesarian section has led me to believe that to save the child one must operate while the mother is still alive. The literature also of the few reported cases seems to demonstrate that under such circumstances more babies survive when delivered through the natural passages. Other conditions of pregnancy such as cornual pregnancy, pregnancy with ovarian cyst and threatened rupture of the uterus from hysteropexy can be successfully treated at times only by Cesarian section.

The need for the emergency operation of Cesarian section during labor is usually indicative of a failure on the part of the attendant to carry out elementary principles of the practice of obstetrics. Either the patient has failed to call on her physician during pregnancy or the physician has committed the gross error of failure to properly inform himself in advance of the condition of his patient. Ascertaining these facts during labor not infrequently leads to infection, and Cesarian section in the face of infection carries with it a very high mortality.

When the operation of Cesarian section is anticipated and is the result of deliberate decision, the patient can be placed in a suitable institution and can be operated on at a time best calculated to conserve the life of mother and child. This selected operation is the ideal procedure and gives the best results. The fetal mortality should be small, and in the hands of a competent operator the maternal mortality should be less than 5 per cent.

There is an absolute indication for operation which is present whenever the disproportion between the passages and the child is so great that it is impossible to remove the fetus even after embryotomy. This is so when the true conjugate is less than five cm. or when the pelvis is blocked to an equal degree by any form of unyielding pathological growth. All other conditions which point to a probable inability on the part of nature to expel the contents of the uterus at term are included in the class of relative indications. Considerable diversity of opinion exists as to the practical value of relative indications, and Cesarian section is opposed by the supposed simpler operations of induction of premature labor, forceps, version, pubiotomy and symphyseotomy. Nature herself not infrequently demonstrates that all these procedures are necessary if the attendant will only give her time and opportunity to exert her power. The reason for this is that it is impossible to judge in advance the strength of the labor pains, the molding of the fetal head, the behavior of fibroid tumors or of cicatricial contractures of the vagina. The size of the fetal head can be only roughly estimated and the internal diameters of the contracted pelvis itself can be ascertained only with a fair degree of accuracy.

The antero-posterior diameter of the pelvic brim gives the most practical indications for the anticipation of Cesarian section. The old limit of seven and a half cm. has been gradually extended so that at present many operators consider eight and a half cm. or even nine cm. in a generally contracted pelvis as indicating the operation. It is a matter of indi-

vidual opinion as to the best way to manage these doubtful cases. Personally I believe the best results not only in regard to the life, but in regard to severe injuries to both mother and child, can be obtained by placing these patients in a properly equipped hospital, permitting them to demonstrate for a reasonable time the effect of labor pains, and when these fail to cause engagement of the presenting part to resort at once to Cesarian section, omitting all preliminary operative procedures which might tend to contuse or infect the uterus or its contents. It is needless to state that the approximate size and the correct diagnosis of position of the fetal head as well as the size and character of the maternal pelvis should be known in advance and that the fewest possible number of examinations should be made during labor.

Referring to the records of 685 confinements which have been under my care at the San Francisco Maternity, the maternity ward at the University of California Hospital and in private practice, I find that in addition to the emergency Cesarian section mentioned above five patients have presented during pregnancy indications for operation. As this series does not include consultation cases and as the above mentioned institutions are comparatively new and have not as yet attracted unusual cases from the profession these records should illustrate fairly well the frequency of the indications for Cesarian section. I desire to report and to analyze these cases, as they present many interesting facts for discussion.

Case 1. Relative indication. M. W. Single 1 Para. Age 18. Applied to the San Francisco Maternity Sept. 1st, 1905. When two years of age her left hip joint had been excised at the St. Luke's Hospital. She did not walk until one year later. For the past few years she had suffered with chronic bronchitis. She did not know the date of her last menstruation. Examination. Patient was five feet three inches tall, well nourished, walked with a marked limp. The physical examination of the chest was negative. The abdomen was enlarged to about the 32nd week. Child in L. O. A. position gave evidence of already being too large for the head to engage in the brim. The pelvic measurements were as follows: External, between spines 22 cm., crests 24.5 cm., left oblique 19.5 cm., right oblique 19 cm., external conjugate 17.5 cm., tuber ischii 8.3 cm. Internal, a marked flattening of the left side of the pelvis could be palpated, true conjugate 7.6 cm. The left extremity was 7.5 cm. shorter than the right. There was a profuse leucorrhea, which later was found to be free from pathogenic germs. Diagnosis, Coxalgic pelvis. The patient was given a simple cough mixture and requested to take cleansing douches. She continued well except for her cough and entered Lane Hospital December 9th, 1905. For four days the cervix was treated daily with 50 per cent solution of argyrol, and she was given daily bichloride douches. There was such evident disproportion between the brim of the pelvis and the fetal head that operation before the onset of labor pains was decided on. The

usual median abdominal incision was made through the umbilicus as a mid point, and an eight-pound male infant delivered through an incision in the anterior wall of the uterus. The time of delivery was forty-five seconds, which is, I believe, a more rational procedure than the ten-second operation advocated by some operators. On account of suspected tuberculosis and at the request of the patient the fundal end of each tube was resected to prevent future conception. The patient developed a postoperative pneumonia, but recovered and left the hospital with her baby four weeks later. Subsequently tubercle bacilli were found in her sputum. The baby was well nourished. It was 52 cm. long at birth, and the biparietal diameter was 9 cm.

Case 2. Absolute indication. F. V. 1 Para. Age 29. Dwarf. Applied to the San Francisco Maternity January 25, 1906. Height four feet. Pelvic measurements: Inter spinous, 22.5 cm.; inter cristus, 23.5 cm.; left oblique, 19.5 cm.; right oblique, 19 cm.; external conjugate, 14.5 cm.; true conjugate, 4 cm. Diagnosis: Richitic flat, justo minor pelvis. Two weeks before term we lost track of this patient, but learned subsequently that she had been delivered by a local surgeon. Mother and baby survived the Cesarian section.

Case 3. Relative indication. Mrs. I. E. 1 Para. Age 25. Applied to the San Francisco Maternity August 15, 1906. English woman of the lower class. Had always been a drudge and in childhood had worked long hours carrying coal and water. Pelvic measurements: Inter spinous, 22 cm.; inter cristus, 26 cm.; left oblique, 21 cm.; right oblique, 21 cm.; external conjugate, 18 cm.; true conjugate, 8 cm. Diagnosis: Simple flat pelvis. Two weeks before expected labor, patient entered Lane Hospital. She was having strong labor pains, and as the head gave indications of engaging in the brim operative interference was not attempted. After twenty-four hours of hard pains she succeeded in delivering herself spontaneously of a six and a half-pound girl baby. The baby was in good condition. The biparietal diameter was 8.5 cm.

Case 4. Relative indication. Mrs. E. N. 1 Para. Age 28. Applied to the San Francisco Maternity April 21, 1907. When seven years old her left hip joint had been excised. Pelvic measurements: Inter spinous, 23.5 cm.; inter cristus, 25 cm.; left oblique, 20 cm.; right oblique, 19.5 cm.; external conjugate, 18.5 cm.; true conjugate, 9 cm. Diagnosis: Generally contracted pelvis. This patient was informed that she could possibly give birth to her child without operation, and she was requested to enter the University of California Hospital. Fearing to attempt labor she applied to a local surgeon and was delivered successfully of a nine-pound girl baby by Cesarian section at the onset of labor pains.

Case 5. Relative indication. Mrs. M. 2 Para. Age 35. Private patient. Some years previously she had been delivered of a live child after thirty-six hours of labor pains. During this delivery three operators had attempted high forceps and had about decided to perforate the head when one attendant

succeeded in dragging the child through the canal. The child lived, but the pelvic organs of the mother were severely damaged. A vagino perineal fistula still persists. During the present pregnancy her attendant had attempted to induce labor at about the thirtieth week. Two weeks later, April 24, 1907, as her physician had left the city for his vacation, the patient applied to me for treatment. The bag of waters had just ruptured. This fact caused me to proceed with the induction of labor, although had I seen the patient earlier I should have recommended Cesarian section at term. Labor was induced by means of Voorhees bags, and a still-born male infant was delivered by a very difficult breech extraction. The child weighed three and a half pounds, the biparietal diameter was 7.5 cm., and along the left parietal and frontal bones was a very deep promontory groove. While under an anaesthetic it was found that the maternal pelvis was contracted latterly to a marked degree and that the promontory, which was high up, projected sharply forward, contracting the true conjugate to approximately 7.5 cm. The external measurements were as follows: Inter spinous, 19.5 cm.; inter cristus, 25.5 cm.; left oblique, 21.5 cm.; right oblique, 24.5 cm.; external conjugate $20\frac{1}{2}$ cm.; between tuberosities, 7.5 cm. Diagnosis: This pelvis was of a masculine, funnel-shaped type. The mother recovered, but still suffers with an incompletely involuted uterus.

It is interesting to note that in this series of nearly seven hundred confinements, aside from the emergency operation of Cesarian section to combat a medical complication, no indication for operation was noted, except pelvic contraction. From careful measurements of the pelvis one patient was found with the absolute indication for Cesarian section, and four patients with the relative indication. Of the three patients coming to Cesarian section the mothers and babies survived. The only patient who attempted the effect of labor pains succeeded in delivering herself, while the only fetal death occurred when premature labor was induced.

Discussion.

Dr. Sherman: The subject is an interesting one, not only for those who practice obstetrics, but for all who have to do with the growing pelvis, and in my life I have had to deal with the pelvis of the growing individual. In two of the cases which Dr. Spalding reported he spoke of the tuberculous hips and the resulting deformity of the pelvis. I have excised a great many hips and have been dealing with the subject of tuberculosis for many years. I have not thought of the future of the patient so far as pelvis shape was concerned, but have gone wide of disease and so have interfered with the lines of ossification where the ischium, ilium and pubis meet. This very probably may have interfered with the breadth of the os innominatum. It is an interesting question and I would like to ask, do the children who have hip joint tuberculosis and go on without operation have better pelves than little girls who come to operation and have to have excision of the head of the femur and acetabulum? That question should be thought of by the orthopedist, or whoever has to decide for or against excision. There is another condition which may or may not deform

the pelvis. Sociosis is a disease which produces a deformity of the spinal column with collateral deformities of the ribs. I have seen cases where scoliosis had produced not only the deformity of the spinal column, but some distortion of the pelvis. There is the question, then, whether an individual with this distortion of the pelvis could go on and become a mother. Again, I have had to examine young women who had had scoliosis and who afterward wished to marry and the question has come up whether they could marry with the expectation of normal or safe deliveries if they became pregnant. I never have made a pelvic examination of such a person, but I have often thought that I would like to find if a moderate scoliosis was likely to produce a deformity of the pelvis so that the individual could not safely be delivered of a child. I have known of a good many young women whom I have treated as young girls for scoliosis who have married and had children in the normal way.

Dr. Spalding, closing discussion: With regard to what Dr. Sherman has said of hip joint excision, I recall a patient who had her hip excised at the age of two. The x-ray plate, taken when the patient was eighteen, showed the failure of the development of the left side of the pelvis. The deformity was due, I believe, to the operation, and the effect it had on the development of the primary bone centers of the os innominatum, together with the later effect caused by the weight of the body. With regard to the point about scoliosis, I have never met with a patient having a contracted pelvis due primarily to a marked scoliosis. Undoubtedly patients with moderate degrees of scoliosis must go through labor without trouble or we would have noticed this condition more often. I do not think it a point well taken to warn patients against marriage or to frighten them unnecessarily simply because they are treated for scoliosis in childhood, but I think they should be warned that when they do become pregnant they should call their physician's attention to the fact of the condition of the spine. There is too much latitude in warning patients against marriage for all sorts of conditions. I think medical science is sufficiently developed to meet these conditions and particularly well adapted to cope with the deformities of the pelvis.

FILLING OF BONE CAVITIES.*

By JAMES T. WATKINS, M. D., San Francisco.

It has long been recognized that bone cavities become sooner or later infected, and that they form a menace, not only to primary union, but also to the subsequent healing of the overlying structures. Attempts have been made to fill them with non-absorbable substances, such as amalgam and cement; and with a number of absorbable substances. Among the latter the autoplastic group—blood clot, skin and periosteum and muscle flaps—have been advocated respectively by Schede, Neuber and Schulten. The heteroplastic group, including the fresh young animal bone of McEwen and Poucet, the decalcified bone chips of Senn, and the plaster of Paris compound of Rosenstirn, have each found its warmest advocate in its inventor. No one method has proved universally satisfactory.

The object of the present paper is to direct attention to a new member of the heteroplastic group,

the iodoform bone plug of von Mosetig-Moorhoof. Dr. James E. Moore of Minneapolis was the first advocate of the iodoform bone plug in this country. I believe that my own case was the first in which it was tried in this section.

The mass was said to have the following characteristic:

(1) It remained solid at body temperatures.

(2) It dissolved at a temperature of 120° F., 50° C., without losing its character.

(3) It was locally non-irritating when introduced into the body.

(4) It was absorbed so slowly as to be non-toxic.

(5) As it was absorbed, its place was taken by organized tissue.

(6) This new tissue either was or very soon became infiltrated with the salts of lime.

In a recent communication von Mosetig-Moorhoof says, "Gradually I arrived at the conclusion that the organism would tolerate only a complete hermetic closure of an aseptic cavity with an antiseptic filling." He prepared such a filling in the following way: Under the strictest asepsis equal parts of spermaceti and sesamoil are melted in an evaporating dish, filtered into a Florence flask and sterilized in a water bath. Next 40 grams of powdered iodoform are put into a sterile flask and 60 grams of the hot mixture added under constant agitation. The flask should not be more than ¾ full, and shaken constantly till the mass solidifies It is then closed with a sterile rubber stopper. The melting point of the plug is 45-48° Celsius. To use the plug, heat the flask again on the hot water bath, never allowing it to get above 55° C., and after shaking well, pour directly from the flask into the wound.

The preparation of the bone cavity comes next. A flap of soft parts and periosteum is turned back, and then all diseased tissue down into sound bone is carefully removed. In order that the mass may run into all the canaliculi and bone crevices, the latter must be absolutely dry. If the liquid mass is run in along the sides of the cavity first, its greater specific gravity will cause the little drops of blood at the bottom of bone crevices to be floated upward upon it; so that when the mass has hardened they can be wiped off its surface with a sponge. While filling the cavity such posturing of the part is required as shall enable advantage to be taken of the laws of gravity.

J. S., aged 14, was referred to me from Ferndale, Humboldt County, by Dr. E. Hammond on January 13th, 1903. He had several discharging sinuses in the lower end of his right tibia, following an acute osteomyelitis dating from March in the preceding year.

February 9th, the tibia was opened through a 5-inch incision on its antero-internal aspect, and a sequestrum 2½ inches long removed. A great deal of porous bone was curetted out as far down as the epiphyseal line. Sinuses leading to the surface were curetted and enlarged. The whole wound was drenched with pure carbolic acid for a minute and a half, washed with alcohol and packed with alcohol gauze.

April 6th, the wound in the tibia was thought to have decreased to about one-half its original size; sinuses had closed; granulations looked healthy. The boy was sent home with instructions to occasionally touch the wound with carbolic, to pack with alcohol gauze, and to report in 6 months.

As a matter of fact, it was two years before I saw him again.

June 5th, 1905, he entered St. Luke's Hospital. The boy had grown several inches since I last saw him. A tremendous depressed scar now appeared at the site of the old operation, and in its center a sinus, which discharged a very little watery pus.

June 6th, the scar was laid open by free incision and the entire old wound cavity, which was full of fibrous tissue, curetted out. It was thought subsequently that the remnant of a sequestrum at the bottom of the sinus might have been located by means of the X-ray. The oozing was stopped by hot water compresses and adrenalin and dried with alcohol, and, I think, ether. The cavity was next filled with Morhoff's mass, which had been heating on the hot water bath. The soft parts were then brought together over the mass with sutures of silkworm gut. To release the tension on the sutures, an incision was made on each side of the primary wound, parallel to it and an inch away from it. These lateral incisions were packed. The wound did not heal by first intention, so on. July 1st, it was again curetted and again filled with the mass. About this time Dr. Moore visited San Francisco. He advised me not to disturb the mass, even though the wound should not heal per primum. Again I failed to get union in the old scar tissue, but this time the mass was not interfered with. The wound was simply dusted with a dessicating powder, and covered with sterile gauze. September 28th, the patient went home.

In May last, Dr. Delamere wrote me that the soft parts had closed over the mass, and the leg appeared to be perfectly well.

In January of this year, through Dr. Delamere's kindness, the accompanying X-rays were taken, and at the same time the boy's mother sent me the picture here presented.

In the letter which accompanied the photo she said: "The new scar is much smaller in every way than the old one, and the depression still present seems to be filling up slowly Jule and I think the second operation was worth while, and were we in the same place again, we would have it done just the same."

This case is not reported as an ideal result of its kind, but to show how much better is even a partial result by this method than what one may expect in all but the very exceptional cases submitted to the older procedures.

The late Professor von Mosetig-Moorhoof performed this operation successfully more than one thousand times For this reason it would seem fair to ascribe failures with the method to technical defects rather than to the procedure itself.

PRELIMINARY REPORT ON A NEW PLASTER COMPOUND FOR PERMANENT SURGICAL DRESSINGS.

By RAYMOND RUSS, M. D., San Francisco.

It is with some hesitation that I venture to make a report on this subject. It has occupied my attention for the past six months, and, while I can appreciate the value of this new plaster compound and can see many ways in which it is an improvement on our old method, at the same time I have not com-

pleted my labors, as I will later point out to you. The adptation of a reaction employed in the mechanical arts and slightly known to general chemists, as it has been protected by many patents, to the usages of surgery, has been a matter of extreme difficulty. Information has been meager and hard to obtain, and the subject has taken me into the literature of various processes of a purely mechanical nature. My studies have given me a great regard for those compounds which, also borrowed from the mechanical arts, have been used with such facility in surgery.

The most conspicuous of these substances is plaster of paris, the general employment of which has marked an important advance in the treatment of fractures. The advantages of an accurate coaptative dressing in the treatment of fractures of the limbs are so great that one who has once learned to handle plaster will certainly prefer it to all other splint materials. Nevertheless there are some objections to the use of plaster and I will endeavor to bring these out in the discussion of the compound which forms the subject of this paper. I would call your attention to one fault, to overcome which was the primary object for undertaking this investigation.

The Roentgen ray penetrates plaster of paris with difficulty, and while it is sometimes possible to secure a good radiograph or make a satisfactory fluorscopic examination, the method is far from being satisfactory as a routine measure. The advantages of the Roentgen ray in the diagnosis of fractures and in the accurate reduction of bone fragments can not be denied. The surgeon is only too glad to avail himself frequently of this help, and as time passes we will rely more and more on this most efficient aid. To obtain, then, a coaptative dressing which would be easily penetrable to the X-ray was the first requisite.

In the search for a compound which would answer my purpose I conducted experiments with water-glass, starch, dextrin and the many substances which have been recommended in the past, but which are now not usually employed. These substances all harden very slowly, and even when the process is ended their use is not very satisfactory. Plaster of paris is far their superior in that hardening consists in a definite chemical reaction, a crystalline salt being formed. This setting can be facilitated by the use of heat or by the addition of salt or alum. It is accompanied by slight expansion and the evolution of heat. There are few substances which, like plaster, possess this power of recrystallization; analogous reactions are afforded by the oxichlorides of zinc and of magnesium.

It is generally recognized by physicists that the penetrability of the Roentgen ray for metals is in inverse proportion to their atomic weights. The non-metallic substances with which metals are combined do not seem to influence this proposition. The atomic weight of calcium is 40, that of zinc 65, and of magnesium 24. One could, therefore, conclude that the penetrability of magnesium compounds would be much greater than that of calcium.

In 1869 Sorel first called attention to the fact that the oxichlorid of magnesium had the remarkable power of setting like plaster-of-Paris when mixed with water. He found that the reaction produced a material much harder and more durable than plaster-of-Paris, so hard in fact that it was capable of taking a polish. The resulting compound showed great tenacity; it could be mixed with fifteen or twenty times its weight of other dry powders without losing this power of setting when water was added. Practically the reaction is accomplished by making a strong solution of magnesium chlorid into a thick paste with magnesium oxid. The mass soon hardens and sets and is found to contain an oxichlorid of magnesium ($MgCl_2$. $5MgO$) associated with a varying quantity of water of crystallization, the amount of water depending on the temperature at which the reaction has taken place. The value of the reaction was quickly appreciated and numerous companies for manufacturing the material were soon formed. The first patents on the process followed quickly on its discovery. At the present day it is used considerably, under a great variety of trade names, for the manufacture of flooring, wainscoting, etc.

For this purpose magnesite, native magnesium carbonate, is employed. It occurs in Austria and Greece in extensive deposits and is also found in California. The magnesium carbonate is first crushed and then calcined at a temperature of 800° to 900°C in rotary pans. Carbon dioxid begins to be given off at a temperature of 600°C and this is apparent by a slight ebullition on the surface. If the temperature is carried too high the power of setting with magnesium chlorid is lost. This substance is mixed for commercial use with about six parts of sawdust or sand and then made into a thick paste with a strong magnesium chlorid solution.

It is hardly necessary to tabulate my various experiments in the adaptation of this reaction to surgical usage, but it will suffice to give simply the practical results of the method. It must be remembered that we are dealing with a reaction which is wholly unlike that of plaster-of-Paris. For instance, in the latter, we use table salt or alum to hasten the reaction, while with the magnesium preparation salt is practically inert and alum slows the reaction instead of hastening it. It has been found, however, that the stronger the solution of magnesium chlorid the quicker the reaction, but here again caution must be observed, for this is a deliquescent salt and its presence in excess will cause our finished cast to "weep." If such deliquescence does occur it can be readily stopped by rubbing on a little dry magnesite.

The magnesia of the drug stores, both the magnesia usta and the magnesia ponderosa, cannot be employed. They are prepared by thorough ignition of the magnesium carbonate and do not set when magnesium chlorid solution is added. Dry heat is a most efficient aid in promoting the rapidity of the reaction. In a general way we may say, the greater the degree of heat employed the quicker the final result, although at very high temperatures the plas-

ter will sometimes crack. It does not become brittle by heating as is the case with plaster-of-Paris. Like plaster-of-Paris a slight expansion occurs in the setting of this magnesium compound and chemical combination is also accompanied by the evolution of a small amount of heat.

I have employed both the California and the imported magnesite, and my results are equally good. The imported material is made by the Concordia Chemische Fabrik auf Actien, Stassfurt, Germany, and the local product manufactured by the Magnesia Products Company, of West Berkeley, Cal. For the making of splints the following technic is employed. Bandages of crinoline are impregnated with calcined magnesite by means of a plaster-of-Paris bandage machine. I prefer a width of three to four inches and a length of three yards. A stock solution of commercial magnesium chlorid is prepared. This should have a specific gravity of 1.250 (28.8 Beaume) and is obtained by dissolving 20.44 parts by weight of magnesium chlorid in 16 parts of water. In our work the best results have been obtained in this strength. If any sulphates are present in the solution they should be precipitated by barium chlorid, as the reaction is rendered slower by their presence. A little of this solution is poured into a container and the bandage immersed in it until bubbles cease to rise. The surplus solution is then squeezed out and the roller applied smoothly, directly on the skin or over sheet wadding as the surgeon may prefer; the magnesite cream is worked in with the hands, avoiding if possible the use of any additional solution. Dry calcined magnesite is then added and rubbed about until the moisture is well taken up, for the finished cast will "weep" if magnesium chlorid is present in excess. If this occurs it can be readily remedied by rubbing on a little dry magnesite. For ordinary work two layers of bandage will be all that is required. The beginner is almost certain to make his splints of this material too thick. A little practice will suffice to show what great rigidity may be obtained in a very thin layer.

There remains but to sum up the advantages of this new magnesium compound:

Penetrability.—The Roentgen ray penetrability as compared with plaster-of-Paris has been estimated by taking equal thicknesses of the set plasters, placing them side by side and radiographing them. As near as can be judged by color, the penetrability of the magnesium compound is about twice as great as that of the calcium. As I can procure the same rigidity with casts of from one-half to one-third the thickness, we may say that the penetrability of our preparation is from four to six times that of plaster-of-Paris.

Hardness.—We have no means of estimating hardness accurately and so I show specimens of the material and of plaster-of-Paris also, that you may make your own deductions. It is only necessary to repeat that our magnesium compound is used in making flooring and is capable of taking a polish.

By employing a knife with a file edge I find no difficulty in cutting it. As an aid in cutting hydrochloric acid may be used, but I have not found this often necessary.

Tenacity.—Our compound is extremely tenacious and it will be only necessary in proof of this to repeat Sorel's statement that it may be mixed with twenty times its weight of inert substance without losing its setting qualities. In thin layers it is also quite elastic, which is an advantage in its favor. It is not brittle and does not chip and break along its edges as does hard plaster.

Weight.—Volume for volume our magnesium compound weighs 1.3 to 1 of set plaster-of-Paris; yet the same strength can be obtained in so much thinner layers that our casts are much lighter. In Colles' fracture in adults I have used magnesite splints, extending from the fingers to the elbow, which weighed but three ounces. This great decrease in weight over our old method is much to the advantage of the patient.

Moisture.—Plaster-of-Paris casts break down and become soggy when exposed to moisture, as about a fenestrum where an open wound is being treated, for plaster is somewhat soluble in water. Moisture has apparently no effect on our magnesium compound.

Setting.—The setting of all cements is divided into two portions, the superficial setting, which may be defined as that state in which the compound is of sufficient hardness to maintain its shape, and the final setting, which marks the end of the reaction. I have found the final setting of magnesium oxichlorid to be a little more rapid than that of plaster-of-Paris. My observations have been made on blocks of the materials of equal volumes and under the same conditions. It is in its rapid superficial setting that plaster-of-Paris greatly excels. It should be borne in mind, however, that these excellent results have been achieved by a careful study of the temperature of calcination and the degree to which it should be carried.

While the casts I here show were made with commercial magnesite, I am obliged to use heat in order to obtain a quick superficial setting. A quick action is not wanted commercially and there has previously been no demand for such a product. I am now conducting experiments with this end in view. A constant high temperature is maintained by an electric furnace and I am testing the reaction after varying degrees of temperature and various lengths of time.

Note.—I regret to add at this time that my labors have thus far proved futile. Variations in the temperature of calcination have made no difference with the time of setting. Combinations with other ingredients have been tried, but where a quick superficial setting was obtainable it was at a great loss of tensile strength. As I have noted above, a fairly rapid superficial setting may be obtained by heat, but when it is imperative to secure a quick setting, as in some fractures, I prefer to cover my

magnesite dressing with a muslin bandage and then apply over this a thin layer of rapidly setting plaster-of-Paris. On the next day this superficial plaster and the muslin bandage are torn off, leaving a hard, permanent cast.

SOCIETY OF EYE, EAR, NOSE AND THROAT SURGEONS OF SAN FRANCISCO.

Dr. Pischel presented the following case: Case of Iris Cyst. A boy 13½ years old. About five years ago somebody struck the patient's right eye with his head, tearing the eye ball, where there is now a white spot in the cornea. Two months ago a black spot was noticed on the brown of the eye, which since then has somewhat increased in size. Status presens: fundus of both eyes normal:

Vision left eye ⟨ 5/3 D = E Javal 0.5 horiz

Vision right eye ⟨ 5/7 ⟨ 5/8; + 0.75 ⟨ 5/6 D= Javal ⟩ 0.25 horiz.

The lower half of the iris is occupied by an oblong tumor nearly touching the cornea, pushing the pupil upwards.

Dr. Pischel then showed to the members how the translucent tumor is covered with a thin layer of pigment.

Second case presented by Dr. Pischel. Piece of steel in eyeball.

This man came to me five weeks ago with the following history: Three days before while in a standing position chiseling off an iron bolt, something flew into the left eye. It was painful for a while but is rapidly getting better.

Right eye, fundus normal. Vision of right eye: 5/3 D = E Javal 0.5 horiz. Vision of left eye 2/60 at daylight, (eye too sensitive to artificial light). Javal 0.75 horiz, slightly irregular. Slight ciliary injection. Just above the center of the cornea a gray scar; a tear in upper part of iris which is bulging at that point. In posterior cortical of lens a few gray radii; near pole seems to be an opening. Just below and behind this latter, slightly swinging at movement of the eye, was seen a glittering foreign body, horizontal, apparently about 1x2½ mm. Disc not quite clearly to be seen.

This was one of the cases in which one may discuss whether it is better to remove the foreign body through the anterior chamber and cornea, or through a fresh opening in the globe through the sclera. For a number of years I have contended that the latter method is preferable, that a clean opening in the sclera with a Graeffe knife and the introduction of a clean magnet tip is less injurious than to pull the foreign body forward into the anterior chamber and through a wound in the cornea, especially when the foreign body has been in the eye long enough for the entrance to be firmly closed. By the latter method the foreign body is liable to pull a large part of the iris with it.

Outward and downward, about 8 mm. from the limous a cut was made in the conjunctiva and afterwards with a Graeffe knife in the sclera. A fine point of Haab's magnet was now introduced into the cut about 5 mm. deep. When withdrawn the foreign body was on it. It was a thin glittering piece of steel 1 mm. x 3. The wound of the conjunctiva was closed with a rattail suture.

The irritation soon passed off. The opacities of the lens may have cleared up a little. The vision four days after the operation 2/60. One month after the operation 2/60: + 6 2/22.

Discussion on first case:

Dr. Nagel: I saw this case about two months ago. I was told that he had been to various men and that the majority had agreed that it was a case of sarcoma of the ciliary body. I looked upon it as a cyst for various reasons, which I will enumerate, but I agree that there was an element of doubt about the nature of the tumor-like formation. To my mind it is a settled question now that it is a cyst. There is a grayish part toward the center and we now get the choroidal reflex through there with the ophthalmoscope from the front distinctly. My reasons for considering it a cyst are, firstly that Fontana's space is not occupied by this protuberance. Secondly the iris is not as we would expect in sarcoma, grown through. Rather than that, it gives the appearance of being pushed aside. Thirdly, it is ago. I was told that he had been to various men a uniform protuberance giving the impression as if there were watery contents behind. Further, I failed, in spite of the most painstaking examination with the Zeiss-binocular loop to discover any blood vessels, which would be most unusual in sarcoma. Somewhat paradoxical, since the protuberance has grown, I find the tension is less than it was at that time, which would also rather confirm the idea that it is a cyst. Apart from the growing through Fontana's space, another mode of sarcoma of the ciliary body, or maybe of the posterior surface of the iris, is to grow through the pupil. If it were possible that it were purely sarcoma of the iris, then I must say it would be very hard to understand why it should not have involved the iris instead of pushing it aside. There is some difficulty about the history. As we all know we usually think of cyst being due to a perforating injury of the eye ball. According to the history the child received a blow six years ago, but I believe he never found reason to complain to the mother about it, and it was about two weeks later when the mother noticed a slight speck and thought it must be connected with the injury, and she took him to an oculist. It therefore seems unlikely to have been a perforating injury. The child did not complain of pain. It is either a congenital cyst or it is that other formation of cyst first described by Schmidt Rimpler, due to obstruction of a crypt and pushing aside the anterior (and posterior) layers of the iris. I am inclined to think that it is of the latter kind. I do not think that it is due to the injury. With regard to the therapy, I would excise the cyst, i. e., would endeavor to excise as much as possible. It is not necessary that there should be recurrence even if some of it is left behind. It is not due to implantation of epithelial cells, as in post-traumatic cysts. A partial excision might suffice. If one fears of going too far it would be necessary to desist and repeat it again later. An operation would decide the true. nature of the formation absolutely. Left to itself a growing cyst will eventually become detrimental to the eye.

Dr. Cohn: I saw this case five or six weeks ago. I stated then that no absolute diagnosis could be made at the time. It was smaller then and as yet not translucent. I stated that it was a cyst or a growth, and I advised that they have the attending physician observe the case carefully until a positive diagnosis could be made. After looking at it tonight, I think it is unquestionably a cyst, but I do not think one could have formed a definite opinion five or six weeks ago.

Dr. Pischel, closing the discussion: I thank Dr. Nagel for having so carefully gone over the case. The diagnosis seems to me beyond a doubt. The transillumination of the tumor especially with Wurdemann's transilluminator excludes a solid tumor like sarcoma.

Discussion on second case presented by Dr. Pischel of foreign body in eye:—

Dr. Sewall: The most interesting point to me in

this case was the question of whether the foreign body should be brought out through the anterior chamber or through a new incision in the sclera. There, of course, are the two schools, divided on this point. I will not go into their different reasons. My own view is that if the foreign body has done much damage in the anterior parts of the eye, to the iris and lense, I believe that it ought to be brought out through the same channel. I also think we should approach the patient to the magnet slowly rather than switch the magnet on suddenly, and we can often draw the foreign body into the anterior chamber and see whether it is attached to the iris and thereby prevent a prolapse of the iris into the wound. It seems to me that the introduction of the magnet into the eye is to be avoided when possible.

Dr. Nagel: It is an interesting point to see this opacity near the posterior pole of the lense. I have seen in a few cases such traumatic opacities near the posterior pole disappear. It would be interesting to note whether this would be still further progressive.

Dr. Pischel, closing discussion: I cannot help thinking that I would have injured the eye much more if I had drawn the foreign body into the anterior chamber and then through a fresh wound in the cornea. We cannot possibly control the foreign body in its way from behind the lens into the anterior chamber. I do not think there is any danger of pulling any retina with the foreign body through the wound. Even the loss of vitreous is very, very small.

Dr. Nagel added a few words further: I would like to say that from Hirschberg's experience we should not hesitate to operate along Dr. Pischel's lines in this case. The hand magnet is very often by far less risky than the giant magnet. Hirschberg would prefer in a case like this to go behind the ciliary body and make a fresh opening. In suitable cases, he likes to guide the foreign body around the periphery of the lense and extract it from in front. He now uses three different sized hand magnets, making four magnets including Haab's.

Dr. Cohn then presented the following case in connection with Dr. Pischel's second case:

Ralph C., aged 8, was brought to me October 23rd. The day before, while hammering an iron hoop on an anvil, a particle struck the right eye. Examination showed a slight subconjunctival or scleral injection, virtually nothing more than a small red blotch in the nasal sclera, about corresponding to the posterior ciliary region. Palpatation of this region through the closed lid slightly painful. Otherwise no objective or subjective symptoms of any nature. Fundus normal. Vision normal. Dr. Painter, of the Lane Hospital, took a couple of X-ray negatives, which revealed the apparent presence of a very minute foreign body,—so small that it was not recognizable on the wet plates. Dr. Deane had the kindness to work out the localization and found it, not within the eyeball but extra-ocular—somewhere in the upper lid. Manifestly this disconcerting discrepancy called for a new set of exposures and a fresh localization, to which, however, the parents did not consent, for the reason that the few vague symptoms above referred to, disappeared within a few days. The eye has appeared normal ever since. As a very minute foreign body can well be tolerated and as the patient on the other hand can report to me as soon as there is the slightest reaction at any time in the future, I do not feel justified in insisting upon operative interference—the more so as the eye is absolutely quiet, the vision normal and one hesitates about exposing an apparently healthy eye to the unavoidable traumatism involved in groping for a particle as small as the one assumed to be here. It would be interesting and instructive to hear from the members present their experiences with respect to the toleration of foreign bodies in the eye.

Dr. Fredrick: A number of years ago I saw an old man, who was a tool sharpener at the Union Iron Works, and whose eye had been wounded by a small piece of steel. This had penetrated the eye without wounding the lens or causing much disturbance of the vitreous, and I could see it embedded in the posterior part of the eye near the posterior pole. I did not have a magnet at the time, and I do not think that I would have used it anyway. The foreign body was so small, and so far back, that I reasoned that the magnet would do the eye more harm than the foreign body. So it remained for two years, during which time I saw the patient at intervals. The eye remained quiet, and the patient resumed his work. About two years after the accident he died. No doubt the piece of steel was quite clean and the disturbance created by its entrance into the eye very slight owing to the peculiar route it took.

Dr. Sewall: In allowing a piece of steel to stay in the eye, it seems to me that it makes a great deal of difference whether the steel is attached or lies free. I saw a man of 25 with a piece of steel in the retina. It had been there for a number of years. There were no symptoms and the foreign body was lying firmly adherent.

Dr. Pischel: In spite of Leber's Classical experiments there is still a difference of opinion about the danger of a foreign body in the eyeball. A few days before Professor Hirschberg's last visit in San Francisco, I had removed an eye of a little girl who had a piece of dynamite capsule in the eyeball. In discussing this case Professor Hirschberg mentioned that he had several patients under observation who had had for many years such pieces in the eyeball without molestation. On the other hand we know that even many years after a foreign body has entered sympathetic ophthalmia may set in. I have observed one case in which a piece of steel caused repeated irritation and finally necessitated the removal of the eye. A boy about ten years old was brought to me with the history that a piece of wood had struck his eye a year previous. After repeated irritations the eye became entirely blind, the fundus was invisible on account of opacities of the vitreous, the fellow eye became sensitive to light, therefore I removed the diseased eyeball and, to my great astonishment (this was before the time of X-rays) I found a tiny bit of steel imbedded in the ciliary body. When I told the patient about my find he remembered that he had hit an ax with a hammer, but had supposed that a piece of wood had hit the eyeball.

NEW AND NON-OFFICIAL REMEDIES.

(Continued from December.)

KASAGRA.

A fluidextract said to conform to drug strength to the requirements of the U. S. Pharmacopeia for fluidextracts. It is prepared with especial care, the drug being extracted with a menstruum containing no alcohol. The preparation is said to contain 0.05 per cent. of alcohol.

Actions and Uses.—Kasagra is recommended as an especially palatable preparation of cascara, owing its laxative effects to this drug alone. Dosage.—1 to 2 Cc. (15 to 30 minims) four times a day, half an hour before meals and at bedtime. Prepared by F. Stearns & Co., Detroit, Mich.

KOLA, Stearns.

Each 30 Cc. (1 fluidounce) is said to represent 31 Gm. (480 grains) of fresh kola nut. It contains 23.5 per cent. of alcohol.

Actions and uses.—Kola seeds contain from 1.5 to 3.6 per cent. of total alkaloids, of which from 1/100 to 1/40 is theobromine and the rest is caffeine. About one-half of the caffeine is combined as kolatannate of caffeine. The actions and uses of the remedy are essentially the same as those of caffeine. It is probable that the kola-tannate is not so active as free caffeine. Dosage.—2 to 4 Cc. (½ to 1 fluidram) three times a day. Prepared by Frederick Stearns & Co., Detroit, Mich.

KRESAMINE.

A clear watery solution of 25 per cent. of trikresol (which see) and 25 per cent. of ethylene-diamine.

Actions and Uses.—Kresamine is a powerful bactericide, with a claimed minimum of toxicity. It is said that the bactericidal effect of the cresol and its power of penetrating the animal tissues are greatly enhanced by the presence of ethylene-diamine and it is claimed to be far less irritating when used as a wet dressing than other antiseptics. It is useful in all cases where an active bactericide is required and particularly when the microbes are in an albuminous menstruum. The preparation is not so dangerous as carbolic acid. It has been recommended for the treatment of ulcers, eczema, lupus and other skin affections. Dosage.—It is used only in dilutions (2 to 25) containing 2 per cent. or less of each of its active constituents. Kresamine may be applied in the form of ointment. A dilution containing 2 per cent. of each ingredient was formerly marketed under the name of "Ethylene-diamine Trikresol Solution." This was used without dilution. Prepared by Chemische Fabrik auf Actien, vorm. E. Schering, Berlin (Schering & Glatz, New York).

LAC BISMO.

A mixture said to consist of bismuth hydroxide and bismuth subcarbonate, suspended in water, in a finely divided state, and containing 0.16 Gm. (2½ grains) of the salts in 4 Cc. (1 fluidram).

Dosage.—4 to 16 Cc. (1 to 4 fluidrams) as directed. Prepared by E. J. Hart & Co., Ltd., New Orleans, La.

LACTOPHENIN.

Lactophenin, $C_6H_4(OC_2H_5)(NH.CH_3.CHOH.CO)=C_{11}H_{15}NO_3$, is a compound differing from acetphenetidin (phenacetin) in that the acetic acid group is replaced by the lactic acid group, $(CH_3CHOH.CO)$.

Actions and Uses.—The effects of lactophenin are similar to those of acetphenetidin (phenacetin), over which it possesses the advantage of greater solubility in water. Dosage.—0.5 to 1 Gm. (8 to 15 grains), in wafers or capsules. Manufactured by Chem. Fabrik, vorm. Goldenberg, Geromont & Co.

LAMINOIDS FERRUGINOUS (NASCENT). ·

Each tablet contains iron sulphate and sodium bicarbonate in quantities equivalent to those of pilulae ferri carbonatis (Blund's pills), but the two salts are separated into two layers so that the formation of ferrous carbonate will occur only when the tablets are moistened. An excess of bicarbonate is present to neutralize the acid in the stomach.

Dosage.—The same as Blaud's pills. Prepared by Schieffelin & Co., New York.

LENNIGALLOL.

Lennigallol, $C_6H_3(CH_3CO_2)_3=C_{12}H_{12}O_6$, is triacetyl-pyrogallol obtained by replacing the hydroxyl groups of pyrogallol with acetyl groups.

Actions and uses.—Lennigallol is said to be non-poisonous and non-irritating, but a mild and painless corrosive. It is introduced as a substitute for pyrogallol in psoriasis, lupus, acute and subacute eczema of children and other skin diseases. Dosage. —In 5 to 10 per cent. ointment with zinc oxide. Manufactured by Knoll & Co., Ludwigshafen a. R.

LIQUOR TRITICI.

A solution of which each Cc. (15 minims) is said to represent 1.75 Gm. (27 grains) of triticum repens in a menstruum containing 23.5 per cent. of alcohol.

Dosage.—4 Cc. to 16 Cc. (1 to 4 fluidrams) at intervals of from two to four hours. Prepared by Parke, Davis & Co., Detroit, Mich.

LITHIUM ICHTHYOL.

A lithium derivation of ichthyol. It is a dark brown mass, somewhat more consistent, but otherwise resembling ammonium ichthyol in appearance.

Actions and Uses.—It is an antiseptic and bactericide. It is recommended as a wound antiseptic and in syphilis. Manufactured by the Ichthyol Co., Hamburg (Merck & Co., New York).

LYCETOL.
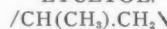
Lycetol, $NH\begin{array}{c}/CH(CH_3).CH_2\backslash\\ \backslash CH_2.CH(CH_3)/\end{array}NH.COOH.CHOH.$ $CHOH.COOH=C_{10}H_{20}O_6N_2$ is a tartrate of a methyl derivative of diethylenediamine (piperazine).

Actions and Uses.—Lycetol is claimed to be a serviceable diuretic and uric acid solvent. It is said to be free from disturbing effects on the stomach and to be well tolerated for long periods. Dosage.—1 to 2 Gm. (15 to 30 grains), well diluted, and preferably in carbonated water, sweetened with sugar if desired. Manufactured by Farbenfabriken, vorm. Bayer & Co., Elberfeld, Germany (Continental Color & Chemical Co., New York).

LYSIDIN.

Lysidin, $\begin{array}{c}CH_2.N:\\ |\\ CH_2.NH.\end{array}C.CH_2=C_4H_8N_2$, is a monatomic base derived from ethylene diamine.

Actions and Uses.—Lysidin is said to be a diuretic and is recommended as a uric acid solvent on the theory that, because it forms a very soluble salt with uric acid, it will facilitate the elimination of that substance. It is claimed that it is superior to piperazine. It is recommended in gout, lithiasis and the various forms of the so-called uric acid diathesis. Manufactured by Farbwerke, vorm. Meister Lucius & Bruening, Hoechst a. M. (Victor Koechl & Co., New York).

MERCUROL.

Mercurol is an organic compound of mercury with nucleinic acid from yeast, containing 10 per cent. of metallic mercury.

Actions and Uses.—Mercurol does not coagulate albumin; it has marked bactericidal power and possesses the pharmacologic action of soluble mercury compounds. It is recommended as a local antiseptic application and as an antisyphilitic remedy. Dosage.—0.03 to 0.12 Gm. (½ to 2 grains). Manufactured by Parke, Davis & Co., Detroit, Mich.

MESOTAN.

Mesotan, $C_6H_4.OH.COO(CH_2.O.CH_3)=C_9H_{10}O_4$, is the methyl-oxymethyl ester of salicylic acid, analogous to wintergreen oil.

Actions and Uses.—The action of mesotan is similar to that of oil of wintergreen, but it is more

irritating to the skin. Dosage.—Being quite irritating when applied pure to the sensitive skin, it is employed diluted with an equal volume of olive oil, and without friction. Simple application to the affected part, which need not be covered, or, if so, only slightly, suffices to give prompt relief. Manufactured by Farbenfabriken, vorm. Friedr. Bayer & Co., Elberfeld, Germany (Continental Color & Chemical Co., New York).

METHAFORM.

A name applied to chlorbutanol (which see). Manufactured by F. Stearns & Co., Detroit, Mich.

MIGRAININ.

A mixture of antipyrine 85 parts, caffeine 9 parts and citric 6 parts.

Actions and Uses.—It is antipyretic and analgesic, combining the actions of its components. Dosage.—0.4 to 1 Gm. (6 to 15 grains) in powder, cachets or tablets, the dose being repeated once or twice during the day. Manufactured by Farbwerke, vorm. Meister Lucius & Bruening, Hoechst a. M. (Victor Koechl & Co., New York).

NEUROCAINE.

Each billet contains cocaine hydrochloride 0.05 Gm. (1/12 grain), without excipient. The billets are ⅛ inch long, 1/20 inch in diameter and very soluble. Neurocaine is used for pressure anesthesia or as a local anesthetic in dental practice. Prepared by Schieffelin & Co., New York.

NEURONIDIA.

An elixir said to contain in each 8 Cc. (2 fluidrams) 0.26 Gm. (4 grains) of veronal (diethylmalonylurea in a menstruum containing 35 per cent. of alcohol, with aromatics.

Dosage.—(8 to 16 Cc. (2 to 4 fluidrams). Prepared by Schieffelin & Co., New York.

NUTROSE.

Nutrose is a sodium salt of milk casein, containing 65 per cent. of proteids.

Actions and Uses.—Nutrose is recommended as a non-irritant nutrient in wasting diseases, such as the cachexias in carcinoma, anemia, diabetes, etc., and in acute and chronic febrile ailments, such as pneumonia, typhoid fever and tuberculosis. Manufactured by Farbwerke, vorm. Meister, Lucius & Bruening, Hoechst a. M. (Victor Koechl & Co., New York).

NOVOCAINE.

Novocaine, $C_6H_4.NH_2(COO.C_2H_4.N(C_2H_5)_2.HCl)=C_{13}H_{21}O_2N_2Cl$, is the monhydrochloride of para-aminobenzoyldiethylaminoethanol.

Actions and Uses.—It is a local anesthetic similar to cocaine, but said to be far less toxic than any of the cocaine substitutes. When infected subcutaneously it is said to exert a prompt and powerful anesthetic action, but the effect is not sustained. This may be remedied by the simultaneous injection of suprarenal alkaloid. Novocaine is not irritant. It is recommended in all cases in which cocaine is indicated. Dosage.—For infiltration anesthesia, solutions of 0.25 Gm. (4 grains) novocaine in 100 or 50 Gm. (3.2 or 1.6 ounces) physiologic salt solution, with or without 5 or 10 drops of suprarenal alkaloid solution (1-1000); for instillations and injections, solutions of 0.1 Gm. (15.4 grains) novocaine in 10 or 5 Gm. (150 or 75 grains) salt solution, with or without 10 drops of suprarenal alkaloid solution (1:1000). In ophthalmology, 1 to 5 to 10 per cent. solution and in rhinolaryngology 5 to 20 per cent. solutions are recommended, with the addition of 6 to 8 drops of suprarenal alkaloid solution (1:1000) to each 10 Cc. (160 minims). Internally, owing to its feeble toxicity, it may be given in doses up to 0.5 Gm. (7½ grains) to adults. Manufactured by Farbwerke vorm. Meister, Lucius & Bruening, Hoechst a. M. (Victor Koechl & Co., New York).

ORTHOFORM-NEW.

Orthoform-new, $C_8H_3.(COO.CH_3)(NH_2)(OH)$, 1:3:4=$C_8H_9O_3N$, is the methyl ester of meta-amido-para-oxybenzoic acid.

Actions and Uses.—Orthoform-new is a local anesthetic, resembling cocaine in its local action, but not penetrating the tissues on account of its insolubility. It has practically no action on the unbroken skin and produces no irritation except slight corrosion about the place of application. It is somewhat antiseptic and practically non-toxic in the usual doses. It is used internally to relieve the pain of gastric ulcer. Since it acts only on ulcerated surfaces, the relief of pain has been assumed to be evidence of the existence of an open ulcer. It has been applied locally as an analgesic to wounds of every description. It has been used in dentistry, in nasal catarrh, hay fever, etc. Dosage.—Internally, 0.5 to 1 Gm. (8 to 15 grains) in emulsion; locally, in substance as a dusting powder or mixed with milk sugar for insufflation, dissolved in ether and mixed with oil for pencilings, or as salve with wool fat (lanolin), etc. Manufactured by Farbwerke vorm. Meister, Lucius & Bruening, Hoechst a. M. (Victor Koechl & Co., New York).

The following articles will be added to the list of new and non-official remedies approved by the Council of Pharmacy and Chemistry:

Benzo-Formol Comp. (H. K. Mulford Co.)
Blandine Comp. (H. K. Mulford Co.)
Creno-Bismuth. (H. K. Mulford Co.)
Methyl-Santal. (H. K. Mulford Co.)
Protan. (H. K. Mulford Co.)
Coryfin. (Farbenfabriken of Elberfeld Co.)
Montal. (Farbenfabriken of Elberfeld Co.)
Novaspirin. (Farbenfabriken of Elberfeld Co.)
Taka-Diastase. (Parke, Davis & Co.)
Colalin Laxative. (Rufus Crowell & Co.)
Maltzyme, plain. (Malt-Diastase Co.)
Maltzyme, with cod liver oil. (Malt-Diastase Co.)
Maltzyme, with cascara sagrada. (Malt-Diastase Co.)
Maltzyme, with iron, quinia and strychnia. (Malt-Diastase Co.)
Maltzyme, with hypophosphites. (Malt-Diastase Co.)
Maltzyme, with Yerba Santa. (Malt-Diastase Co.)
Maltzyme Ferrated. (Malt-Diastase Co.)

COUNTY SOCIETIES.

SAN JOAQUIN.

The regular meeting of the San Joaquin County Medical Society was held in the office of Dr. R. R. Hammond, December 2, 1907, with the following attendance: Drs. R. R. Hammond, C. R. Harry, S. W. R. Langdon, E. A. Arthur, J. D. Young, F. R. Clarke, Mary C. Taylor, J. P. Hull, A. W. Hoisholt and R. B. Knight.

Nominations of officers for the ensuing year were as follows:

President—E. A. Arthur, nominated by Dr. Hull; S. W. R. Langdon, nominated by Dr. Taylor.

First Vice-President, J. P. Hull.

Second Vice-President, Mary C. Taylor.

Secretary and Treasurer—R. B. Knight, B. J. Powell, B. F. Walker.

Committee on Admissions—Minerva Goodman, Margaret Smythe, R. R. Hammond, C. R. Harry, F. R. Clarke.

Committee on Ethics—A. W. Hoisholt, J. D. Young, J. P. Hull, W. W. Fitzgerald, Hudson Smythe.

Committee on Finance—S. E. Latta, J. J. Tully, H. E. Sanderson.

Trustees—J. G. Thompson, H. W. Taggart, D. F. Ray.

Delegates to State Society—R. R. Hammond, J. P. Hull, Alternates—A. W. Hoisholt, H. E. Sanderson.

No further business appearing, the society adjourned.   R. B. KNIGHT, Sec. Pro. Tem.

PUBLICATIONS.

Progressive Medicine, December, 1907. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by Hobart Amory Hare, M. D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College, Philadelphia, assisted by H. R. M. Landis, M. D., Assistant Physician to the Out-Patient Medical Department of the Jefferson Medical College Hospital. Six dollars per annum. Lea Brothers & Co., publishers, Philadelphia and New York.

The Practice of Obstetrics. By American Authors. Edited by Charles Jewett, M. D., Professor of Obstetrics and Gynecology in the Long Island College Hospital, New York. Third Edition, Revised and Enlarged. Illustrated. Lea Brothers & Co., New York and Philadelphia. 1907.

I shall speak of the merits of the work first and then of its demerits, even at the risk of leaving a bad last impression in the mind of the reader. At the outset I was very much predisposed in its favor from what I knew of the reputation of Dr. Jewett.

I started to read this book through and very soon began to wonder why the author was duplicating his previous statements. When I reached the chapter on eclampsia it seemed somehow very familiar and I began to think. I took down a copy of Edgar and saw a clear parallelism. It seemed strange that two men could agree so closely in thought and style. Further on I read the chapter on septicaemia and I could almost imagine that I was following Williams; the arrangement was almost identical, and then I turned to the preface and I found that the volume was nothing but a disconnected lot of essays by prominent men, each of whom has better expressed his ideas in another place.

This is not the fault of Dr. Jewett, nor perhaps altogether of the publishers, who are keen business men and presumably aware of what the American physician is willing to pay for. But the result is that our medical literature is not thereby elevated. Beautiful single volumes, as this, are produced to sell; and, when too late, the purchaser finds that they are a rehash of other works or essays edited by some man of prominence. Occasionally a small book will be published with borrowed cuts—for cuts cost money—written by one man, who tries to cover a large field in one condensed volume.

Our American books are on too good paper and too expensively bound for their short life and I personally long for the time to come when we can get them unbound and uncut like the German and French works, each an exhaustive treatise on some limited subject, with special cuts and all extraneous matter eliminated.

This compilation of Dr. Jewett's is no better, nor is it worse, than many others, and its value is equal to one divided by all other such books now on the market.

It is well printed and bound. I only noted one typographical error where, on page 444, the inter cristal measurement is called the inter-costal. It has 37 reduced cuts from the work of Farabeuf and Varnier, and has also used many of the expressions found therein.

The book has excellent chapters on eclampsia, toxaemia, artificial feeding, post partem and placental hemorrhages and muscles of the perineum. The views advanced on episiotomy, the use of ergot and acetic acid in hemorrhage, nitro-glycerin in eclampsia, delivery of the posterior shoulder first, personal use of the patheter, etc., appeal to me as being exactly right.

But I do not think that the perineum should be excluded from a part in labor, nor that the ovary causes menstruation, nor that urea is a valueless test of excretion. Neither do I like to have pressure on the head through the perineum extolled nor traction in the axilla advocated. The advice given to wait four to six hours before putting the child to the breast is not good. There are some other matters that I cannot agree with, but I should not contrast my experience with that of the writers.

Nothing is said of the use of hyocine in labor nor of pubiotomy. The necessity of "chin front" in face presentations is not impressed, nor do I think the pushing of the cord to one side in breech cases even mentioned. Again, from all stated to the contrary, one might do a version hours after the end of the first stage. The relative frequency of multiple births is ignored. Of the obliquities of the head in flat pelves, Nagale's only is mentioned, and very little said of the conservation of the transverse position in such cases.

As was to be expected in a compilation, the book abounds with reduplications, which in many instances do not agree. One man advocates ligating the maternal end of the cord, the other does not. One considers urea a "fairly reliable index" of excretion, the other says it "has been shown to be of little value." Nursing, rigid cervex, haematoma vulvae, abortion, pelvic measurements and placental detachment are all treated twice in more or less extensive articles.

There are ten and a half pages on symphesiotomy, now nearly again fallen into desuetude, and just a half page on pubiotomy. There are twenty-one pages in one place and seven in another on monstrosities, all out of proportion to more important subjects. About four pages are devoted to uterine inversion, its causes, diagnosis and treatment in extenso, one of the rarest of accidents.

Ophthalmia neonatorum is only superficially touched upon and one of its symptoms given is "pain in the eye." Just how we are to gain this knowledge from the little sufferer is not explained. Embriotomy is not correctly defined on page 750. Some of the authors use the metric system and others give the measurements in inches, and this, too, in a third edition of the work.

I have tried to be fair and not unjust in my review. I have endeavored to eliminate any personal bias from every statement. The isolated essays have the merit that the authors' names would lead us to expect and it is with the compilation as a whole that I am displeased. It but adds one more to the already too numerous volumes of this class now on the market. The compilation is not improved by the divergent views expressed by the contributors and has lost the unity and system that the work of one man assures. Any one of them could write a better book and several of them have done so.   R. C.

BOARD OF EXAMINERS, DECEMBER SESSION.

Passed.

School of Medicine.	Date of Graduation.	Percentage.
Coll. of P. and S., S. F., Cal.	6, 6, 07	80.0
Cooper Med. Coll., S. F., Cal.	5, 6, 07	84.1
Cooper Med. Coll., S. F., Cal.	5, 8, 07	80.2*
Cooper Med. Coll., S. F., Cal.	5, 9, 06	80.2
Cooper Med. Coll., S. F., Cal.	5, 8, 07	78.4*
Cooper Med. Coll., S. F., Cal.	5, 8, 07	76.5
Univ. of Cal., S. F., Cal.	5, 14, 07	86.3
Univ. of Cal., S. F., Cal.	5, 14, 07	77.4
Univ. of So. Cal., L. A., Cal.	6, 14, 06	82.2
Univ. of So. Cal., L. A., Cal.	6, 13, 07	81.1
Univ. of So. Cal., L. A., Cal.	6, 13, 07	78.9*
Univ. of So. Cal., L. A., Cal.	6, -, 05	77.7*
Univ. of So. Cal., L. A., Cal.	6, 13, 07	77.1
Univ. of So. Cal., L. A., Cal.	6, 13, 07	76.8
Univ. of So. Cal., L. A., Cal.	6, 12, 06	75.8
Bellevue Hosp. Med. Coll., N. Y.	6, -, 04	83.6
Bellevue Hosp. Med. Coll., N. Y.	5, 9, 98	82.5
Bennett Coll. of Eclec. Med., Ill.	5, 2, 02	76.0
Coll. of P. and S., Keokuk, Iowa	2, 26, 90	80.8 plus 5=85.8
Detroit Med. Coll., Mich.	2, 29, 76	81.9 plus 15=96.9
Hahn. Med. Coll. of Phila., Pa.	5, 10, 99	76.6
Harvard Univ. Med. Coll., Mass.	6, 28, 05	93.7
Jefferson Med. Coll., Pa.	6, 3, 07	80.9*
Queen's Coll., Belfast, Ireland	7, 27, 04	77.9
Rush Med. Coll., Ill.	9, 1, 07	86.9
Univ. Coll. Hosp. of London, Eng.	7, -, 85	75.2 plus 10=85.2
Univ. of Colo.	6, 5, 07	78.3
Univ. of Mich.	6, 22, 05	87.8
Univ. of Minn.	6, 6, 01	87.9
Univ. of Pa.	6, 13, 06	76.1**
Univ. of Toronto, Can.	6, 13, 02	86.1
Westminster Hosp. Coll., London, Eng.	-, -, 00	78.4

Failed.

School of Medicine.	Date of Graduation.	Percentage.
Cal. Med. (Ecl.) Coll., Cal.	5, -, 06	63.6
Coll. of P. and S., Los Angeles, Cal.	6, 18, 07	77.5
Coll. of P. and S., S. F., Cal.	6, 6, 07	77.0
Coll. of P. and S., S. F., Cal.	5, 17, 06	72.9*
Coll. of P. and S., S. F., Cal.	6, 6, 07	65.6
Coll. of P. and S., S. F., Cal.	5, -, 04	8.1
Cooper Med. Coll., S. F., Cal.	5, 18, 07	71.7*
Cooper Med. Coll., S. F., Cal.	5, 8, 07	71.2*
Cooper Med. Coll., S. F., Cal.	4, 28, 03	67.2
Univ. of So. Cal., L. A., Cal.	-, -, 07	75.6
Univ. of So. Cal., L. A., Cal.	6, 14, 06	70.7
Univ. of So. Cal., L. A., Cal.	5, 14, 06	67.4*
Univ. of So. Cal., L. A., Cal.	9, 3, 04	60.2***
Bellevue Hosp. Med. Coll., N. Y.	3, 1, 78	58.2 plus 10=68.2
Bellevue Hosp. Med. Coll., N. Y.	3, 1, 80	54.9 plus 10=64.9*
Bowdoin Med. Coll., Me.	6, -, 95	80.9 plus 5=85.9
Coll. of P. and S., Ill.	6, 15, 06	78.2
Coll. P. and S., Columbia Univ., N. Y.	6, 13, 00	71.1
Ensworth Med. Coll. Hosp., Mo.	3, 8, 98	61.2
Georgetown Univ., Wash., D. C.	-, -, 00	74.7
Hahn. Med. Coll., Chicago, Ill.	4, -, 01	64.1
Hahn. Med. Coll., Chicago, Ill.	4, 26, 05	52.0
Hahn. Med. Coll., Phila., Pa.	5, -, 95	73.2 plus 5=78.2
Howard Univ., Wash., D. C.	6, 1, 06	66.4***
Jefferson Med. Coll., Pa.	5, 2, 93	57.7 plus 5=62.7
Kansas Med. Coll., Kans.	3, 23, 92	46.7 plus 5=51.7*
Louisville Med. Coll., Ky.	3, 25, 97	41.1 plus 5=46.1
N. Y. Homeo. Med. Coll., N. Y.	6, -, 02	79.8
N. W. University, Ill.	6, 16, 04	71.6
Tufts Coll. Med. Sch., Mass.	-, -, 05	17.5
Univ. of Ill.	6, 4, 07	80.5
Univ. of Ill.	6, 4, 07	74.1
Univ. of Iowa.	6, 12, 07	73.8
Univ. of Iowa.	3, 3, 85	54.8 plus 10=64.8

Univ. of Louisville, Ky	6, 29, 05	66.7**
Univ. of Md	6, 4, 07	74.1*
Univ. of Mich	6, 26, 84	71.2 plus 10=81.2
Univ. of Mich	3, 6, 79	59.3 plus 10=69.3
Univ. of Mich	6, -, 92	69.1*
Univ. of Mich	6, 25, 91	62.9 plus 5=67.9
Univ. of Mich	7, -, 86	56.4 plus 10=66.4**
Univ. of Mo	4, 27, 97	69.7 plus 5=74.7***
Univ. Med. Coll. of Mo	3, 26, 03	47.6
Univ. of Pa	6, 13, 95	76.6 plus 5=81.6*

Osteopathy—Failed.

Amer. Sch. of Osteop., Kirkville, Mo	6, 22, 97	48.7 plus 5=53.7
Amer. Sch. of Osteop., Kirkville, Mo	6, 22, 05	11.6
Central Coll. of Osteop., Kansas City, Mo	6, 22, 05	46.7
Northern Institute of Ohio	6, -, 00	48.3

+ Credit given for years of practice.
* Taken before.

Percentages.

Cal. Med. (Ecl.) Coll., Cal.—0 Passed, 1 Failed.—100% Failed.

Coll. of P. and S., Los Angeles, Cal.—0 Passed, 1 Failed.—100% Failed.

Coll. of P. and S., S. F., Cal.—1 Passed, 4 Failed.—80% Failed.

Cooper Med. Coll., S. F., Cal.—5 Passed, 3 Failed.—37½% Failed.

Univ. of Cal., S. F., Cal.—2 Passed, 0 Failed.—0% Failed.

Univ. of So. Cal., L. A., Cal.—7 Passed, 4 Failed.—36 4/11% Failed.

New Licentiates.

H. V. Brown, Mathew Campbell, John A. Clark, J. L. Cooke, Carroll C. Elliott, Wm. V. C. Francis, Sam'l A. Goldman, R. W. Harrod, F. P. Kenyon, Paul H. Lane, Geo. S. Loverin, Duncan D. McArthur, M. R. McBurney, M. Lee Martin, Chas. O. Mitchell, C. H. Montgomery, A. S. Musante, D. D. Nice, C. B. Palmer, Lee M. Ryan, L. L. Sexton, W. C. Smiley, Stephen H. Smith, S. E. Sweitzer, H. N. Taylor, Geo. H. Trevalyan, Harry W. Turner, Robt. G. Whitlock, Jas. L. Whitney, Lawrence Wing, W. A. Winship, A. H. Winter.

REGISTER CHANGES—

Those members who desire to keep their Registers corrected up to date should check this list carefully. In the following will be found all the official changes (in California) received from the 15th to the 15th.

Ardenyi, Joseph, from 973 McAllister to 1117 Turk st., San Francisco. **Arnold, J. Dennis,** from 1900 Webster st. to 2201 California st., San Francisco. **Armstrong, Maurice M.,** from Severance Bldg. to Lissner Bldg., Los Angeles. **Atkins, M. W.,** from 579 Seventeenth ave., San Francisco, to Burlingame, San Mateo Co.

Botsford, Mary E., from 1809 Broadway, to 807 Francisco st., San Francisco. **Bresee, Paul,** Conservative Life Bldg. to Lissner Bldg., Los Angeles.

Carolan, Herbert, from 1714 California st., to 2319 Buchanan st., San Francisco. **Chamberlin, H. H.,** from County Hospital to Coulter Bldg., Los Angeles. **Cheney, Wm. Fitch,** from 33 Spruce st., to Shreve Bldg., San Francisco. **Colliver, John A.,** from Bradbury Bldg. to Laughlin Bldg., Los Angeles. **Crees, Robt.,** from Paso Robles, San Luis Obispo Co., to Lakeport, Lake Co.

Ebright, Geo. E., from 2500 Fillmore st., to 2446 Washington st., San Francisco.

Fehleisen, Fred, from 902 Devisadero st., to 1211 Polk st., San Francisco. **Fitzgibbon, G. J.,** from 204 Haight st., to 1048 Larkin st., San Francisco.

Harms, F. W., from Galt, Sacramento Co., to First Nat. Bank Bldg., Berkeley.

Hannah, Jas. B., from Mill Valley, Marin Co., to 396 Guerrero st., San Francisco.

Kearney, J. F., from 237 Pierce st., to 3672 Twentieth st., San Francisco.

Miller, Austin, 1155 Broadway, Oakland, to Porterville, Tulare Co.

Murphy, Claire W., from Pacific Mutual Bldg., to Lissner Bldg., Los Angeles.

Scholtz, Waldeman, from 1223 Forty-seventh ave., San Francisco, to Susanville, Lassen Co. **Skeel, Donald N.,** from Douglas Bldg. to Grosse Bldg., Los Angeles. **Stone, W. J.,** from 1152 Kentucky st., San Francisco, to San Quentin, Marin Co.

Weber, Louis, from Sixth and Main sts., to Lissner Bldg., Los Angeles. **Worthington, Geo. B.,** from 2411 Pacific ave., San Francisco, to Marysville, Yuba Co.

Zelinsky, Frank, from Glendale to Auditorium Bldg., Los Angeles.

New Members.

Marin County—**Stone, W. J.**

San Francisco County—**Butler, Jos.; Cowden, A. F.; McGill, A. B.**

Santa Clara County—**Blair, Jas. C.,** 45 N. First st., San Jose; **Koeher, Jacob J.,** 15 S. First st., San Jose; **Tourtillott, W. W.,** Morgan Hill.

Sonoma County—**Clark, James W.; Temple, Jackson,** Santa Rosa.

Deaths.

French, James M., San Diego.
Zeile, Eugene, 1717 California st., San Francisco.